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The Far East and Hevea

QUINCY TUCKER, of Boston, is moving to have the American rubber trade arrange some sort of tribute for Sir Henry A. Wickham, who in 1876 brought Hevea seeds to London. These being germinated and sent to Ceylon were the beginnings of Hevea culture in the Far East. As Mr. Tucker rightly holds, American manufacturers have profited largely through this act. Moreover, Mr. Wickham is entitled to much credit. His pension and knighthood show that the British are of the same mind. But should others who did as much or more than Wickham be wholly ignored?

The securing of Hevea seed originated in the mind of Sir Clements Markham of the India Office. He it was who first sent James Collins to Pará and secured Hevea seeds which were brought to Kew, germinated and sent to Calcutta. Unfortunately they did not live. Later he sent two men, Robert Cross and Henry A. Wickham, to Brazil to get Hevea plants and seed. Cross secured 1,000 plants and got them to London in excellent condition. Wickham got 70,000 seeds and also successfully landed them at Kew. The Cross plants and the Wickham seedlings arrived in Ceylon within one month of each other. Both were responsible for the rubber plantations that followed.

In all this the chief honor would seem to belong to the moving spirit, Sir Clements Markham. The British also seem of this opinion, for on the silver salver in Kew Gardens that is there "to commemorate the introduction of *Hevea brasiliensis*, the Pará rubber, into the Eastern hemisphere," the name at the head of the list of those responsible is Sir Clements Markham. Below those listed as "collectors" come the names of Cross and Wickham.

Under the circumstances such an effort as our genial friend Mr. Tucker desires, would seem to be an embarrassment to Wickham and unfair to the memories of Markham, Collins and Cross. To do anything further for Sir Henry Wickham would be like requesting an encore of a benediction.

One View of Labor Shortage

IN an article entitled "Is Labor Shortage an Unmixed Evil?" contributed to *Management Engineering*, Charles Piez, president of the Link Belt Co., takes issue with those manufacturers who are sure that the remedy for high prices lies almost wholly in letting down the immigration bars so as to lessen labor costs, and with those consumers who are equally positive that real and alleged profiteering would be wholly checked were the United States Government to enforce general price reductions through federal control of industry. At best, either could be only a palliative measure, for, as Mr. Piez points out, neither strikes at the root of our industrial troubles, and when applied they only aggravate a perplexing problem. Bringing in foreign labor in volume might relieve manufacturers during peak periods; but what, he asks, is to be done with an army of idle aliens during the inevitable depression? Many unemployed may be a real menace.

Of equivocal advantage, and often of real peril, to the state's well-being is governmental price regulation, which, while assuming to protect buyers, discourages enterprise, confuses normal trade movements, and which spurs demand while a buying fever is raging, but offers no relief when slump succeeds boom. The eagerness of some to exhaust purchasing possibilities puzzles Mr. Piez, who sees good for neither nation nor individual in business fluctuating from freezing to sizzling. He counsels manufacturers to do all in their power to stabilize demand so

as to afford regular employment for all workers and productive concerns; and as some means toward that end he suggests that they cease bidding for labor that does not exist, making extravagant promises of delivery, or offering needlessly tempting terms of credit. Reasonable restraint tends toward permanent prosperity.

Simplified Practice Profitable

A DISTINGUISHED foreign student of industrial conditions in this country once sagely remarked that if American manufacturers were as economical as they were enterprising they would command the trade of the world. Our industrialists were reproached for their eagerness to score high in gross production, involving much waste, while scorning more reasonable output with a lower percentage of time, material, and investment loss. While there is a large measure of truth in the indictment, there are many indications of an improving tendency. Leaders of industry here are awakening to the need of adopting more rational manufacturing policy and practice. A few years ago one large rubber manufacturing concern made 3,000 different kinds and sizes of articles. Today it makes scarcely half a hundred, turns out a larger volume of better products, and makes a great deal more money. But it took "nerve" to do it.

Secretary Herbert Hoover of the Department of Commerce early realized the imperative need of reformation in American manufacturing methods, and has been cogently, consistently, and insistently preaching in practical fashion the importance of standardization with simplification as an effective means for holding and extending foreign trade, while decidedly improving domestic commerce. Some of the most valuable publications of the government are the plain pamphlets and bulletins of the Department of Commerce showing, for instance, the saving that can be effected and the profits and other advantages gained by elimination of excess variety. As Secretary Hoover points out, "Simplified practice will decrease stocks, production costs, selling expenses, misunderstandings, and costs to user, while increasing turnover, stability of employment, promptness of delivery, foreign commerce, quality of product, profit to producer, distributer, and user."

Referring to the rubber industry, a typical case is cited in which the variety of products was reduced from 145 to 29 (80 per cent) with direct benefit to the manufacturer.

"AUTOMOTIVE INDUSTRIES," WITH THE SAME ALERTNESS that characterizes its research comment, points out some very interesting possible results in automobile construction if large air cushion tires supplant the present type.

Not as a certainty but as a possibility will come lighter axles, entirely different springs, a radical change in body structure, and a notable reduction of car weight in general. To this of course is added the comfort that accrues to the passenger.

Passing of Horace De Lisser

THE sudden passing of Horace De Lisser, the honored president of The Rubber Association of America, comes as a shock to a host of friends the world over. A man of great executive faculty, forceful, patriotic, genial, "four-square," he will be sadly missed and long remembered.

LONDON WILL SOON HAVE A REAL ZONE OF SILENCE. IT will surround the Cenotaph, Britain's imposing monument to her sons who fell in the World War. Over a considerable area about the empty tomb a rubber pavement will be laid by Rubber Roadways, Ltd., at no cost to the ratepayers, that will not only abate the din of traffic in that part of Whitehall but will demonstrate anew that rubber is serviceable for surfacing much-used driveways. The decision of the city authorities to accept the offer is of especial interest inasmuch as it marks the successful ending of a long, brave fight by the *Rubber Age* of London to have this work done as an object lesson of the manifold advantages and practicability of rubber paving.

A CREDIBLE STORY FROM BOSTON TELLS OF A SUBURBAN road laborer being struck on the head by a ball of atmospheric electricity and rendered unconscious for four hours. The doctor who revived him is sure that his patient would have been killed at once had he not been insulated from the damp ground with rubber heels. Thus it appears that rubber heels save wearers from perils overhead as well as underfoot. What an advertising chance those heel-makers are missing; for while they might imply that with other makes of heels wearers would be as vulnerable as Achilles, with theirs they might not only defy the thunderbolts of Jove, like Ajax, but even take a chance on a "ball" of Jersey lightning.

EIGHTY YEARS AGO IT COST THOUSANDS OF DOLLARS TO prove that rubber was practically useless without vulcanization. Today makers of pure plantation rubber products in England claim that vulcanization is practically useless, at least for their shoe soles, mats, loofahs, soap purses, toys, etc. The raw rubber sole went into the discard a hundred years ago because it was only plain Brazilian caoutchouc that stuck in summer and cracked in winter. In the 1922 renaissance, however, we get a sole that is said to be not only 100 per cent pure plantation gum, but has a minimum of viscosity and a maximum of flexibility, is much lighter and lasts even three times as long as any vulcanized fitting. If this raw product really fulfills all the claims made for it, well might we, Hamlet-like, propound the poser, "To cure or not to cure? That's the question."

"IN ALL THINGS SHEWING THYSELF A PATTERN OF good works: in doctrine shewing uncorruptness, gravity, sincerity." Titus 2:7.

Forty-Cent Rubber Necessary

The following extract from a careful survey of rubber planting costs was prepared by H. Eric Miller, one of the British delegated visitors to the United States last January. H. Stuart Hotchkiss, president of the United States Plantations, Inc., and the General Rubber Co., to whom the letter was written, states that the figures quoted coincide with the costs for the product of their own great plantations in Sumatra. In passing the letter on, Mr. Hotchkiss says, "The agitation for lower-priced rubber is exceedingly unfortunate and mischievous, because, taking a long view, the prime essential is that the American industry must be provided with adequate supplies of raw material at reasonable prices. To attain this, new money must be attracted to the planting industry, and this cannot be accomplished unless investors can see a reasonable return to compensate them for the risks involved in tropical agriculture." Mr. Miller's letter follows:

"I WILL endeavor to summarize the main facts which it is necessary to bring into account when considering the price at which rubber must sell in order to attract additional capital.

"In the first place let us look at the capital outlay which has to be faced in order to open, develop, and equip for production a rubber estate of an economic size. In order to get as accurate a figure as possible you must spread your investigation over a wide field. Take the last annual report of the Rubber Growers' Association and on page 8 you will find a statement of the issued capital of all the company members, with the acreage planted or interplanted with rubber owned by them. Ceylon is not fairly representative as set out there, because a number of the Ceylon companies own tea estates not interplanted with rubber, and their issued capital covers the ownership of these tea estates as well as of their rubber estates. To a small extent this applies also to Java. Neither of these countries offers the possibility of undertaking any large scale planting of rubber, and the main countries to look at are Malaya and Sumatra.

"The issued capital of the 288 Malayan companies works out at £58 per acre and in Sumatra the figure is exactly £60. The statement of issued capital does not include debentures or reserves invested in the estates, but I think we can set those off against the very small amount of 'water' represented in the issued capital. Taking also into account the fact that most of the readily accessible land has been taken up and that you have to go farther afield to find suitable rubber land, I am absolutely satisfied that £60 per acre cash outlay is a conservative statement of what must be invested to bring an acre of rubber into being and into bearing properly equipped. This figure allows for all the operations proceeding normally without any particular set-back, and doing the work thoroughly on recognized lines, putting in permanent buildings with the factory equipment as at present customary.

"Quite apart from the R. G. A. figures we have, as you know, a pretty wide experience of what can be done in the way of planting rubber and bringing it into bearing, and our own experience shows that £60 per acre is an under-estimate rather than an over-estimate. There are exceptions to every rule, but bearing in mind the risks inseparable from any plantation operations in the tropics there are as many places where the cost is more than £60 per acre as there are with a lower cost. In Borneo, another country where land is plentiful, the history of the estates already in existence there shows a capital cost well in excess of the average £60 just mentioned, but I do not attach very much importance to that because the work has not been tackled there in what one would, in the light of present knowledge, describe as a thoroughly businesslike manner.

"Preparatory to writing you I have been through all the past history of one or two of our own companies which have been under our control right from the commencement of clearing operations, and without any abnormal difficulties £60 is under the actual cost because we generally close the capital account before all the acreage is really self-supporting.

"Secondly, as mentioned in the report of the R. G. A. delegates, a reasonable rate of interest must be allowed on the cash outlay during the period which elapses before any profit can be taken out of the business. Six per cent simple interest is the lowest rate you can take on an average of £35 per acre during 7 years from the word 'go.' That in itself is no attraction to any one. You must have the practical certainty ahead of you of a really good return on your money after the long waiting period, and it would not be unreasonable to assume that unless there is at least an average of 15 per cent on the money laid out from the time it is invested, the public would not consider it at all attractive. The large amount of British capital which was put into the plantation rubber industry was attracted there not by a stolid 15 per cent, but by the very much larger margin of profit which was obtainable in the earlier days of the industry when rubber had a scarcity value. The position today is very different, production having outrun absorption to the point of rendering the industry unprofitable and necessitating exceptional measures to cope with the crisis thus brought about. A deal of faith is required to put new money into new rubber estates whilst substantial increase in the volume of rubber which already existing plantations are capable of giving during the next few years is looming ahead. The real bait of very big profits is no longer there, and although enlightened folk inside the industry, who visualize a still greater expansion in the consumption of rubber, may be willing to put up the money for new planting, and although existing plantation companies may carry out moderate extensions, I do not see any likelihood of large additional planting whilst the outlook is so uncertain.

"Thirdly, I now deal with the question of cost of production after a close study of the 1922 accounts of between 80 and 90 companies not selected but taken as they come (excluding, however, companies with mixed cultivation and confining myself to rubber producing companies pure and simple). The year 1922 was a year of the utmost economy when staffs were kept down to the minimum and not a cent of expenditure incurred that could possibly be avoided. The very lowest cost I can find for a company operating in Malaya is 6*d* per pound 'all-in,' London; the average of the Malayan companies is 8½*d* per pound, and that without any export duty during 10 months of the year, so this figure must be raised to 9*d* per pound to include the current export duty which is likely to be maintained in one form or another.

"It is true that restriction was carried out voluntarily during 1922 by a number of the companies under review, but after going into the matter very carefully in regard to our own estates it is not possible to think of maintaining costs even of a full crop at below the actual cost of 1922.

"In Ceylon, with its lower currency value, costs are as near as

possible 1*d* per pound less than in Malaya but I have reason to believe that much less manuring was done there in 1922 than has been customary in previous years, and as I know Ceylon produced nearly a full crop in 1922, 8*d* per pound 'all-in' is fairly representative of Ceylon average cost.

"The Dutch East Indies costs are on a par with Malaya, and we cannot produce full crops there any cheaper per pound than we have brought down the cost of our restricted crops because we have been tapping only the best yielding areas and trees. Furthermore, as soon as ever profits accrue, commissions to staff and local taxation come into the reckoning, both of which were absent last year except to a very small extent.

"In these figures are included head office administration charges and depreciation on buildings and machinery, but no depreciation of the trees. The life of the tree is limited and in the Dutch East Indies the concessions are only for a specified number of years, and whilst the question of amortization is not a pressing problem, provision should, strictly speaking, be made for that in reviewing the subject in the comprehensive way which you desire to do. Something between a ¼*d* and ½*d* per pound should be allowed for on this account, and even in the countries where the tenure of land is virtually perpetual, a similar fund should be accumulated for eventual replacement of the existing trees when their productive life is run out.

"Fourthly, we come to the question of what is the average number of pounds of rubber which an acre of rubber may be relied on to yield after it attains maturity. In the delegates' report we put down the figure of 400 pounds, and subject to possible improvements which may be introduced in the average quality of rubber trees planted hereafter by means of seed selection, bud-grafting, or otherwise, as to which we have so much to learn yet, I say without hesitation that the existing area planted with rubber in the Middle East will not, year in and year out, give an average yield in excess of 400 pounds to the acre.

"In this connection it may be useful to give you the result of an investigation made by the controller of rubber exports in Singapore just published in the F. M. S. Government Gazette of May 18. He investigated the crop produced by 555 estates of over 200 acres each during 1919-20, a period of 'all-in' production, and making an equivalent allowance for the areas which were at that time not yet in full bearing, he arrives at a figure of 384 pounds as the average output per acre of fully mature rubber. None of us today would revert to the method of tapping which was customary in 1919-20 because we know that a lighter system of tapping is necessary in order to ensure adequate bark renewal, but I do believe that by nursing our trees judiciously we should be able to maintain an average yield of something between 360 and 400 pounds per acre. On well managed estates, excepting in South India where climatic conditions limit them to something like 200 pounds per acre, such as are covered by this F. M. S. survey, much greater care is exercised over bark reserves than is the case on native holdings, and although for a short time native holdings give even higher yields than the figure mentioned, they do not, however, in the long run, give such a high average.

"From the point of view of an investor in a new estate, the 400 pounds per acre figure is the only one that can be attained unless seed selection and bud-grafting make a pronounced difference on what has been achieved in the past, and it is this poundage of rubber which has to produce the profits. We therefore come to the following calculation of what is the minimum return which might satisfy an investor in rubber estates. I doubt whether this yield would be sufficiently attractive to tempt people who don't understand the business to put new money into it, but that is a matter of opinion which you can weigh from a different angle, having in view the sort of return which American investors are able to secure in other lines of enterprise.

"The expenditure of £60 per acre on land, development, equipment and bringing into bearing, may be divided up approximately as follows:

1st year	£20 plus 15%	£3
2nd year	£10 plus 15% on £30	£4½
3rd year	£5 plus 15% on £35	£5¼
4th year	£5 plus 15% on £40	£6
5th year	£5 plus 15% on £45	£6¾
6th year	£15 plus 15% on £60	£9
	£60	£34½

"As no revenue has yet been forthcoming you have really a debit of £94½ on your investment account, and as your rubber trees are still only in partial bearing at this stage, and your investment account would have to be charged up with some of the interest which will not be covered by profits it is not far wrong to take £100 as representing your investment of cash plus interest of 15 per cent until your rubber trees are in full bearing. This figure is capable of reduction if you are satisfied to take 10 per cent interest instead of 15, which would reduce the total figure to £87.

"The cost price of each pound of rubber c. i. f. is shown to be 9*d* per pound in full bearing; therefore to maintain a yield of 15 per cent on £100 you will require a net profit of 9*d* per pound. All your rubber is not first quality so that a profit of 9½*d* on your No. 1 quality is required. Adding a ½*d* per pound for amortization you arrive at a market price of 1*s*/7*d* per pound for No. 1 grades in New York or London to give the 15 per cent return. As far as British capital is concerned, income tax will have to be paid by the investor out of that 15 per cent, which reduces the attractiveness of it considerably.

"I remember Mr. Barron, whom we traveled with on the 'Olympic,' most emphatically pointed out that the 6 per cent which the delegates put down in their calculation to cover interest on the money during the waiting period was altogether too low for American ideas; but to sum up on a conservative basis all that I have written in this letter, a price of 1*s*/6*d* for No. 1 rubber is the minimum that will satisfy investors' reasonable requirements.

"I have not gone into minute detail in this letter because we are taking a comprehensive view of the subject, but your knowledge of the intricacies of rubber growing will enable you to satisfy your own mind that what I have written is as nearly correct as it is possible for any one to give data which can be relied on."

AMERICAN AND BRITISH GOLF BALL TRADE

According to the Department of Commerce, Washington, D. C., England and Scotland exported to the United States during the period September 22, 1922, to April 30, 1923, 1,927,697 golf balls, valued at $792,641. It has been estimated that at the present rate of increase the number of golf balls used in the United States during the year 1923 will amount to 13,200,000. Nearly one-fourth of these balls, it is said, will be of British origin. English manufacturers are able to make these shipments despite the present duty of 30 per cent ad valorem as compared with a duty of 25 per cent in 1920 and 1921 when British golf balls constituted about one-sixth of the United States trade.

American manufacture of golf balls, constituting about 75 per cent of the entire consumption in the United States, is carried on mainly by ten American firms, although there are several small organizations also producing. The leading imported golf balls retail at around $1 each; American-made golf balls are priced in various classes at $1, $0.75, $0.55 and $0.45, while certain hollow rubber balls, used for practice purposes, retail at less than 25 cents each.

As golf is becoming increasingly popular in all countries, there should be opportunity for America to compete with England in the manufacture and exportation of golf balls. For the American-made golf ball there is apparently an increasing and unlimited market.

Shoeing a Car With Low Pressure Air[1]—II

By J. E. Hale[2]

Effects on the Operation of the Car

REGARDING the application of air cushion tires and their effects on car operation, I believe we have reasonable answers for all of these questions. Probably the most frequent one is fuel consumption. In general, air cushion tires consume no more nor less fuel than high pressure pneumatics. Observations on 6 taxicabs running a total of 20,000 miles on 7.30 inch air cushion tires gave an average of 13.5 miles per gallon. This compared with 12.6 miles per gallon for a larger number of similar cabs covering many times that mileage on 33 by 4½ inch 6-ply tires with 70 pounds of air. With air cushion tires, the cars coast just as freely and accelerate practically the same as with high pressure tires.

The question next frequently raised is how the steering is affected. From laboratory tests we have found the area of contact of the air cushion tires with the road surface to be about twice that of the high pressure pneumatics, and under these conditions one can detect a slight difference in turning the wheel. In ordinary driving this effect is of such minor consequence that it cannot be considered a serious handicap.

The traction and braking control of the car in driving is probably of equal importance with fuel consumption and ease of steering. On wet pavements (with the brakes properly equalized) I have tried to make my car skid, but so far the only thing which happens is that the car stops. On snow and ice the control of the car with air cushion tires is noticeably better than with high pressure pneumatics.

The question of danger from a flat tire has come up. If one were driving at 40 or 45 miles an hour and had a blow out on the right front what would happen? We tried the experiment of producing a flat tire on the right front wheel of a Packard twin six test car with 7.30 air cushion tires. Starting inflated, but with the inner tube valve insides backed out to rapidly deflate the tire, we ran along at between 35 to 40 miles per hour for a considerable distance after the tire was entirely deflated. We found it was necessary for the observer to step out on the running board to actually look at the tire to be sure that it had become fully deflated, and the driver found that he could take his hands off the steering wheel with no tendency to give trouble.

This brings up the question of how great is the drop when the tire becomes deflated. Table I gives the figures showing the difference between full inflation and a flat tire.

Some people are apprehensive lest the side-sway be objectionable. This, in my opinion, is a point of view. I presume that a little more side-sway can be detected and measured with the air cushion tires than with the high pressure pneumatics, but it is my observation that after becoming accustomed to the car, all thought about this feature disappears from the mind.

Another feature of control in driving is the new attitude on the part of the driver to the roadway, particularly if he drives much after dark. He soon finds that where formerly he slowed down or steered for the smoothest places in the street, this is not necessary with air cushion tires. While it is apparent that the car can be driven much faster over the average of the highways with the almost complete elimination of vibration, I am wondering whether the power plant and transmission system will stand this higher average speed without suffering? Conclusions on this point will have to be drawn by those skilled in observing such things and particularly by making direct comparisons with tires on the old equipment. It is my opinion that the increased speed will amount to somewhere between 10 and 30 per cent.

For some reason which is not very clear to me, cars equipped with air cushion tires develop a violent galloping when they are not equipped with snubbers or shock absorbers. This is so noticeable that I can predict disappointment to any one equipping a car without the use of snubbers or shock absorbers.

Fig. 1. A 4-Ply 7.30 Air Cushion Tire That Blew Out After Wearing Through Breaker and Three Plies.

At the present time it appears that the amount of gather or toe-in on the front wheels will have to be very nicely adjusted to prevent the excessive wear which appears with improper alinement. Our observations point clearly to the fact that air cushion tires are more sensitive to improper alinement than the high pressure pneumatics.

There are two features of car operation which register against air cushion tires. I have in mind the mud splashing and dust raising propensities. The larger section tires spatter mud much

TABLE I

DISTANCE WHEEL DROPS WHEN TIRE BECOMES DEFLATED.

Air Cushion Tires		Pneumatic Tires	
Size	Wheel Drop	Size	Wheel Drop
4.40	2⅛	3½" Cl.	1⅞
5.25	2⅜	4 "	2⅜
6.20	3⅛	4½"	2⅞
7.30	4¼	5 "	3⅜

[1]Continued from THE INDIA RUBBER WORLD, July 1, 1923, 622-624.

[2]M. S. A. E., Manager of development department, Firestone Tire & Rubber Co., Akron, Ohio. Paper read at the June meeting of the Society of Automotive Engineers, Spring Lake, New Jersey.

more than any other tires heretofore brought out, and as for dust raising on country roads, I can say that it is terrible.

Durability and Cost of the Tires

All our development work on air cushion tires has been carried out under actual road test conditions. To date we have run a total of 850,000 tire miles under test observations, and evidence points to average mileages at least as high as those enjoyed with regular pneumatic tires. Ply separation and tread separation will be minimized in air cushion tires, and with these eliminated, the most prominent troubles will be fabric breaks in the carcass; also punctures and rapid tread wear on the front wheels when they are not alined properly. There are no grounds for concern regarding numerous punctures. In 50,000 car miles of operation on our test fleet, there were 7 punctures, and in 100,000 miles of operation in taxicab service, there was an average of 1 puncture for each 3,700 cab miles. The explanation is that the tire yields rather than be pierced by the puncturing object.

The light carcass structure also raises the question as to whether they will stand rough usage. A large measure of our road testing development was on tires of the 4-ply construction and their performance showed almost unbelievable ruggedness. One of these 4-ply 7.30 test tires gave out after having worn through the breaker and 3 of the 4 plies (See Fig. 1). The interesting point is that it continued to run on this single ply for a considerable distance before finally blowing out at this point, as can be clearly seen in the picture.

One interesting point is the fact that air cushion tires run their life with no tread cuts whatever. I have seen a good many tires that have covered over 7,500 miles which were so free from tread cuts that had they been washed up, they could be taken for new. The same applies to the sidewall; that is, in running ruts or against curbs, or loose rocks in the road, an air cushion tire yields to the blow, thereby protecting itself and escaping injury.

Misalinement of front wheels manifests itself very quickly by rapid tread wear. In the few cases, however, we have had no trouble in eliminating this by prompt attention to the realinement. With long tire life and favorable fuel consumption and protection of the car against destructive vibration effects, I believe the cost of car operation will be lower. At the present time it is not possible to give any comparative tire costs because we have not had an opportunity to get volume production figures. The manufacturing details will be sufficiently different from those of regular pneumatic tires to have a slight influence tending to increase the tire cost.

There is another factor which has a larger influence on the cost element than the manufacturing processes. I refer to the section size of the tire and the number of plies to be used. In a general way I have reached the conclusion that the amount of cotton and rubber used in air cushion tires need not be much if any greater than that in the tires which they replace. Therefore, if we increase the section, we can make a corresponding decrease in the thickness of the walls of the tire.

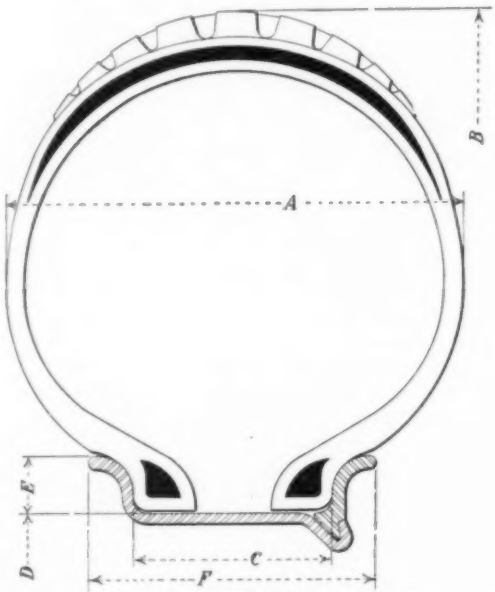
How Can Low Pressure Tires Be Applied to Automobiles

The foregoing covers our research development work of the fundamental air cushion idea and the result of all these activities since early last fall has been to confirm our judgment that we were working on a sound basis. The next logical move is to translate the low pressure principles into practical application to motor cars with the aid of the motor car engineers.

In order to draw forth constructive criticism, I know of no better way than to propose what appears to me to be an ideal line up of tires and rims. This was suggested earlier in the paper and is now presented more in detail in Fig. 2 which contains an outline drawing of tire and rim with the principal dimensions. The 4.40 air cushion tires of either 2 or 4 plies on a 3 inch S. S. rim is proposed for cars with approximately 100 inch wheel base now using 3½ inch pneumatics. The 5.25 in 4 plies on a 3½ inch rim is to substitute for 4 inch regular pneumatics on cars ranging from 109 to 115 inch wheel base. The 6.20 in 4 or 6 plies on a 4 inch rim is designed to serve in place of some of the 4 inch and most of the 4½ inch on cars of 118 to 126 inch wheel base. The 7.30 air cushion tire in 4 or 6 plies on a 4½ inch rim is offered to serve in place of a few 4½ inch and all 5 inch tires as applied to cars of 130 inch wheel base and over. Each one of these 4 sizes has been fitted to a job in the group for which they are recommended and it is our thought to have comments on how successful we have been in working up this specific proposal.

In submitting this proposal, which is based on our experience in road tests combined with experimental applications to motor cars, we believe that when it is finally worked out to the state where it is suitable for commercial use air pressure recommendations ranging from 20 to 35 pounds will be satisfactory. Also our tests have shown that the 45 per cent ratio of rim width to tire section as a basis of tire design, while being quite a departure from the 10 or 12 year old criterion of 66 per cent, is practical as far as tire performance is concerned and has the exceptionally meritorious advantage of making a substantial reduction in unsprung weight; and, finally, is the most efficient combination of the number of plies and tire section to result in tire costs which will not be burdensome to the industry.

It seems to me that the car designers must view this problem from two aspects: first, whether there is anything inherent in the application of such tires to the car which makes them undesirable; second, the specific changes in body, axle, fender and other features of car design which he would have to undertake to accommodate some changes in physical measurements.



	Principal Dimensions							
Nominal Size	Actual-Tire Section A	Overall Diameter B	Rim Width C	Rim Diameter D	Flange Height E	Overall Width of Rim F	Ratio of C/A, per cent	Rim-Size Old Design
4.40	4.40	29½	2.00	20	0.59	3.06	45+	26x3
5.25	5.25	31¼	2.31	20	0.69	3.43	44+	27x3½
6.20	6.20	33¼	2.68	20	0.78	3.89	43+	28x4
7.30	7.30	35¼	3.12	20	0.87	4.38	43-	29x4½

Fig. 2. Tentative Air Cushion Tire and Rim Sizes for Passenger Cars

Dwelling for the moment on the fundamentals underlying this movement, allow me to turn questioner and ask: Does the

motor car industry want to go as far as this proposal? Does it want to have narrower rims and a light carcass structure in the tire, or would it rather go to some half-way point? For instance, where I propose a 7.30, 4 ply (or 6 ply) tire on a 4½ inch rim for 130 inch wheel base cars, would it be along a line of less resistance and more appeal to car manufacturers to use a

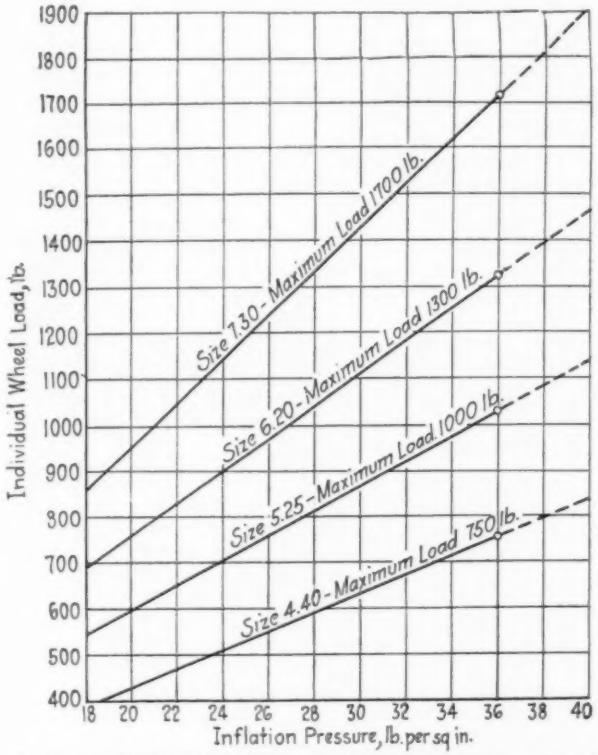


Fig. 3. Graph Showing Air Pressure Necessary for Given Wheel Loads Based on 23 Per Cent Deflection

smaller section, say a 6 inch tire of 6 plies on a 5 inch rim, or would the 7.30 section tire suit all right if it were on a wider rim; and so on down the list of sizes? How should we modify the proposal, bearing in mind always that this ideal line-up employs the lightest weight rim, the lowest air pressure and least costly tire construction? In order to take advantage of low pressure air, a large area of contact is necessary, and a large area of contact cannot be had without a high percentage of deflection, and this in turn calls for a thin carcass and large section. What are the problems of practical application which the car designer must recognize and master? Are they fundamental and far-reaching, or merely clearance and gear-ratio alterations?

Fender, body and brake drum clearances, also change in tread of the car in fitting air cushion tires, bring up a very complex situation. Suffice it to say that it must be accepted as a foregone conclusion that any change in tire equipment which results in the use of larger sections and smaller rim diameters is very likely to bring about interferences and changed relation of parts which must be provided for. It is to be sincerely hoped that the automobile industry will not requisition more than one standing diameter for each section. The tire manufacturers have always been dreaming of the time to come when they would not have to make a series of standing diameters for each section, and whatever the final disposition of this matter, I bespeak for the tire industry a real serious attempt to carry out some such program.

Table II gives weights of tires, tubes and two-piece rims such as are used for disk or wire wheels and with the standing diameters to furnish a comparison of the air cushion with pneumatic tires.

Reverting again to the schedule as proposed, it will be noted that a new size-nomenclature is included. It has always seemed to me that the sizes of the tires are so far-fetched that I could not resist the temptation to propose a new disposition of this matter. I think everybody is aware that a 34 by 7 tire, for instance, has no part of the tire which measures 34 inches and likewise no part of the tire measuring 7 inches. I propose that when we finally work into air cushion tires, the true section size be used as the name size.

It is my belief that in introducing the air cushion tire, the industry should start with the firm determination to make oversizing unnecessary and not even provide for it. At the present time the cases where the owner needs to put on an oversize tire are extremely rare (I wish we might say the same thing about pneumatic equipment for motor trucks).

I propose that the deflection of the air cushion tires be limited to approximately 23 per cent of their section diameter. Having decided on this, it is a very simple question to decide on the load and inflation pressure schedule by weighing the loads which the 23 per cent deflection will carry per each pound of inflation. This is set forth in graphic form in Fig. 3. This I propose as my suggested load and inflation pressure schedule, and in applying it in practice, I believe it unwise to simply publish the graph along with the price lists and try to translate it into a table of load and inflation pressures such as has been done in the past. It seems to me the only logical thing to do would be for each car manufacturer to weigh the front and rear of each of his models with full passenger load. With the tire equipment decided, check off the proper inflation for each end of the car and stamp it on a small plate to be attached to the car in some conspicuous place so that the car owner can feel that this subject has been given consideration by the car manufacturer and that he has their best judgment as a guide in what he should do. It is my judgment that air cushion tires should be very carefully inflated and should check to within one pound of the correct pressure.

TABLE II

WEIGHTS AND STANDING DIAMETERS

Air Cushion Tires Weights					Pneumatic Tires Weights					
Size	Tire	Tube	D Rim	Total	Standing Diameter	Size	Tire	Tube	D Rim	Total	Standing Diam. (high and low of tires on market)
4.40 2 ply	13.3	2.7	11.4	27.4	29½	30x3½ Reg. Cl. Cord	11.9	1.8	Cl. Rim 12.0	25.7	30⅝ to 31⅝
4.40 4 ply	14.5	2.7	11.4	28.6		Oversize Cl. Cord	14.0	2.1	Cl. Rim 12.0	28.1	
5.25 4 ply	21.1	4.0	12.8	37.9	31¼	SS Cord	14.1	2.1	15.5	31.7	
6.20 4 ply	27.2	4.8	14.8	46.8	33¼	31x4	21.3	2.7	16.8	40.8	32⅛ to 33
6.20 6 ply	31.7	4.8	14.8	51.3		32x4	21.7	2.8	17.4	41.9	32½ to 34
						33x4	22.7	2.9	18.0	43.7	34⅝ (Firestone)
						29x4½	22.8	3.1	18.8	44.7	30½ (Firestone)
						32x4½	25.6	3.4	21.6	50.6	33½ to 34½
						33x4½	25.9	3.5	22.5	46.8	34¾ to 35
						34x4½	27.4	3.6	23.5	54.5	35⅝ to 36⅛
7.30 4 ply	34.3	5.2	18.8	58.3	35¼	30x5	29.3	4.0	18.8	52.1	32 (Firestone)
7.30 6 ply	38.8	5.2	18.8	62.8		33x5	37.2	4.6	21.6	63.4	34⅝ to 36
						35x5	39.4	4.9	23.5	67.8	36½ to 37⅛

The Superiority of Hard Rubber Radio Panels[1]

Nature of Hard Rubber—Compounding—Applications—Manufacture of Hard Rubber Sheet—Physical Properties and Workability—Electrical Properties—Radio Frequency Insulation

VULCANIZED rubber compositions are practicable through ranges of unlimited variations in composition, physical qualities, and degrees of vulcanization conforming to equally varied service conditions. Technically, the critical point is adaptation of the product to service conditions. In general, soft rubber products are suited for service conditions demanding elasticity, exclusion of moisture and ability to resist abrasive wear, while hard rubber products afford resistance to corrosive chemicals and possess high dielectric quality. In both soft and hard rubber production many complicated problems are involved requiring for their solution much experience, study and experimental work.

Nature of Hard Rubber

Essentially, hard rubber is rubber compounded with a relatively high percentage of sulphur and cured for a comparatively long time at a relatively high temperature. Although there is no line of demarcation between hard and soft rubber, it is approximately correct to say that the sulphur content of hard rubber ranges from 15 to 50 per cent of the combined weight of the rubber and sulphur, the average being in the neighborhood of 30 per cent. Upon the ratio of rubber to sulphur depends, to a large extent, the hardness and other properties of the final product. It is possible to vary the hardness by limiting the cure, but in general this has been found to be bad practice, because incompletely vulcanized rubber is less stable than the properly cured product.

Hard Rubber Compounding

Both hard and soft rubber products are differentiated as to composition, cure and physical properties. The compounder of hard rubber mixings does not use as great variety of ingredients as the compounder of soft rubber stocks. In both lines, however, crude rubber and sulphur are basic, supplemented and modified by active and filling compounding ingredients and reclaimed rubbers to best suit the product desired.

The use of reclaimed and fillers does not necessarily make a poorer composition but in many cases produces greater superiority for the purpose intended than would a simple combination of crude rubber and sulphur only. In fact, some hard rubber manufacturers stock as many as 25 different grades of reclaimed rubber, each of which is used for a specific purpose in the production of compositions satisfactory for service.

Physical, chemical and mechanical properties and close tolerances on finished product determine the constituent parts of the compound. In many cases the article could not be produced satisfactorily without specific fillers and the use of reclaimed rubbers.

Applications of Rubber

An unconfirmed popular estimate credits present day uses of rubber in 30,000 different articles. Of these, a small but relatively important minority pertain to hard rubber. The demand for hard rubber has largely increased by the development and rapid extension of radio work, especially for panels, telephone and other parts of receiving sets. These applications alone utilize hard rubber in all its standard forms of sheets, rods, tubing, and molded shapes.[2] Probably the greatest poundage for sheet is now taken for panels and has given that form much popular interest because of its superiority as radio frequency insulation and its ease of mechanical working.

Manufacture of Sheet Hard Rubber

Raw hard rubber composition is run to gage in sheet form on a calender, then transferred to zinc covered tables and thoroughly oiled with kerosene to prevent adhesion in handling.

Sections of raw sheet are laid between layers of highly polished rolled zinc, care being taken to eliminate all air from between the contracting surfaces. In this form the rubber is subjected to curing in a hydraulic press suitably arranged to secure close gaging of the sheet. After the cure, the zinc covering is stripped off leaving the rubber surfaces highly finished, corresponding to the polish of the zinc plates.

Use of Accelerators

The use of organic accelerators of vulcanization has brought a profound change in hard rubber mixing and curing with corresponding advantages in quality and quantity of output. After the cure, the sheets require only to be inspected, trimmed and packed.

Physical Properties

While it is impossible to state definite values for the physical properties of hard rubber the following will serve as a general guide:

Tensile strength, 1,500 to 10,000 pounds per square inch.
Compressive strength, 3,000 to 20,000 pounds per square inch.
Elongation, from 2 per cent in the harder, to 75 per cent in the softer grades.
Specific gravity, 1.14 upwards; average about 1.20.
Scleroscope hardness, 35 to 65.
Effect of heat—all but the specially hard grades soften noticeably at 160 degrees F.
Hard rubber is nonporous, nonabsorbent, nonhygroscopic and odorless.

Working Hard Rubber

Hard rubber is not difficult to machine. In working qualities it resembles metal and is capable of taking a high polish. It can be cut, sawed, ground, turned, drilled, tapped and otherwise machined with tools ordinarily used for metal working. The speed of feed and depth of cut are less than for metals, but properly adjusted, are accomplished without cracking, chipping or burning the material.

Saws and Drills

Band saws are commonly used for sawing hard rubber, the speed usually being about 4,500 revolutions of the band wheels per minute, gage of the saw same as for wood, six teeth per inch and very little set of the teeth to eliminate danger of chipping the rubber. Drills should be more tapered than for use in metal, with the cutting edge ground nearly flush with the flutes of the drill.

Molded Hard Rubber

Hard rubber can be molded as well as machined accurately to size. Metal inserts may be molded in it and metal objects covered with it. Moldings are made to dimensions plus or minus 0.002-inch. Sheets are made to gages as follows:

Sheet Thickness	Tolerance
0.005-inch	—0.000 to + 0.002-inch
1.000 inch and over	—0.000 to + 0.024-inch

[1] Data from American Hard Rubber Co., United States Rubber Co., and "Hard Rubber and Its Applications in the Chemical Industries." By A. C. Huttfield, Journal of Industrial and Engineering Chemistry, May, 1923, 474-475.

[2] "Hard Rubber in Radio Instruments." THE INDIA RUBBER WORLD, April 1, 1923, 733-735.

Electrical Properties

Hard rubber has some remarkable electrical properties. Its dielectric strength runs as high as 1000 volts per mil, and its insulation resistance (resistivity) ranges up to 12,000,000,000 megohms per centimeter. Tests have shown a grade of hard rubber, prepared especially for radio work, to have a lower inductive capacity and phase angle at radio frequencies than eleven other well-known materials.

Hard rubber of suitable compound is chemically inert to a high degree and is successfully used in connection with a great many corrosive materials. Many laboratory tests have been made in which hard rubber has been immersed in various chemicals for long periods of time. Some typical materials in connection with which hard rubber has actually been commercially used for years are: Sulphuric acid of not over 1.50 specific gravity, nitric acid of not over 1.12 specific gravity, hydrochloric acid of any concentration; acetic, hydrofluoric, hydrofluosilicic, and phosphoric acids; sodium and potassium salts, such as hydroxides, chlorides, sulphates, etc., zinc chloride, ferric chloride, stannic and stannous chlorides, calcium chloride, and many others, as well as corrosive gases, such as chlorine, hydrochloric acid gas, etc.

Hard rubber is attacked by most rubber solvents, such as benzine, carbon disulphide, and chloroform, which tend to soften and swell it.

American Hard Rubber Co.

Hard Rubber Panel Stock Room—Panels Cut to Stock Sizes, Packaged, and Ready for Shipment

Advantages of Hard Rubber Panels for Radio

Radio reception demands the use of insulation having certain definite characteristics which are not necessarily the same as those required in ordinary electrical service.

Insulation which will fully protect against leaks and losses in direct and alternating currents may prove quite inadequate in radio-frequency service. This fact has caused no little misunderstanding on the part of manufacturers and individuals, who construct radio receiving sets, because claims made for the effective characteristics of insulating materials frequently are based upon conditions which either do not apply to radio at all or whose application is relatively unimportant.

It is obvious, therefore, that because radio reception deals with very weak currents at very high frequencies, any leakage due to poor insulation will have a marked effect on the character and volume of the current delivered to the phones or the loud speaker.

A recognized authority[2] on radio says:

"Radio experts are beginning to question the reliability of electrical characteristics based only upon direct current or comparatively low-frequency alternating current measurements. Electrical tests made at the tremendously high-frequencies of the average broadcast carrier wave require extremely sensitive instruments and correspondingly intelligent handling.

"Current leakage between binding posts or other mounted metallic parts of the set is responsible for a good share of the losses that occur in the receiver. At comparatively low frequencies chemically compounded materials are about on a par with hard rubber in this respect. But at radio frequencies these figures are not at all applicable, for a new phase of the insulator's structure becomes predominant. The leakage in the compounded insulators increases considerably, and the reason advanced is that the structure consists of solid substance in which are microscopic pockets containing more highly conductive material. The mixing process, it seems, is inadequate to produce complete uniformity. These pockets act as a series of tiny condensers that at high frequencies form a convenient leakage path. The result of experiment indicates the necessity for new standard methods in testing of insulators to be used at radio frequencies. It also tends to revive confidence in hard rubber for radio mountings."

Radio Frequency Insulation

Summarizing results with hard rubber insulation in radio reception: It has been definitely established that there are six physical characteristics by which radio frequency insulation must be judged. The extent to which these characteristics are possessed by various materials immediately determines their relative desirability for radio work. Of these factors three are electrical values, determined by laboratory measurements. These are: (1) low phase angle difference, (2) low dielectric constant, (3) high resistivity.

The remaining three characteristics are: (4) low absorption of moisture, (5) workability, and (6) appearance.

Low absorption of moisture is important because any insulation having the least tendency to absorb atmospheric moisture

[2] Ralph K. Potter, of the New York Tribune Institute.

may quickly lose in insulating value because of leakage and short circuits between terminals, damaging the efficiency of reception and increasing its tendency to swell and warp. This danger is avoided by the use of a grade of hard rubber in which the percentage of moisture absorption is practically nil.

Workability is important because it has a bearing upon the ease, accuracy and workmanship with which the manufacturer or individual may obtain results in building and particularly bears on the cost of construction to the manufacturer to whom speed, low cost and economy on tools are necessary.

Concerning appearance, it is obvious that a highly polished surface with a jet black or mahogany grained effect will materially enhance the appearance of any set. The man who builds a single instrument, as well as the manufacturer who produces thousands of sets, will take a justifiable pride in a finished product on which the appearance of panel, dials and knobs is equal if not superior to anything of its kind offered for sale and in keeping with the design and finish of the cabinet in which it is enclosed.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

(223) We are asked for addresses of concerns supplying colors for use in dipped goods manufacture.

(224) Inquirer desires information in regard to suppliers of treated resin.

(225) Request is made for addresses of manufacturers of benzol.

(226) A reader wants to know where he can purchase pure gum sanitary aprons in patterns.

(227) Inquirer desires to purchase marbleized rubber.

(228) We are asked for addresses of manufacturers of hard rubber utensils such as pails, dippers, jugs, etc., particularly for the use of the vinegar and spirits trades.

(229) Inquiry is made for addresses of manufacturers of rubberized cloth for shower baths.

(230) We are asked where hard rubber dust may be commercially obtained.

(231) Addresses are desired of manufacturers of hard rubber goods, such as handles for fishing reels and ringer cranks on telephones.

(232) A reader wishes to get in touch with manufacturers of vulcanizing equipment.

(233) We are asked for a list of manufacturers of men's rubber belts.

(234) Inquiry is made for addresses of manufacturers of cushion tubes.

(235) Information is asked regarding manufacturers of lithopone, rice flour, glue, and felspar.

(236) A correspondent desires to get in touch with manufacturers of paper for wrapping tires.

(237) We are asked where white ground cotton linters and cotton flock may be purchased.

(238) A reader wishes to get into communication with makers of wooden molds for dipped goods.

(239) A subscriber wishes to be advised as to manufacturers of Lewis lye.

(240) Foreign inquirer requests the address of manufacturers of machines for grinding scrap rubber and also machines for separating the fabric from the rubber scrap.

(241) An inquirer in the interest of a prospective foreign purchaser of a number of jinricksha rubber tires asks for addresses of manufacturers.

Foreign Trade Opportunities

Addresses and information concerning the inquiries listed below will be supplied to our readers through the Foreign Trade Bureau of The India Rubber World, 25 West 45th street, New York, N. Y. Requests for each address should be on a separate sheet and state number.

Number	Country and Commodity	Purchase or Agency
6971	Sweden—Drugs, including plasters, rubber and zinc oxide, suture materials and other surgical supplies	Purchase
7008	Sweden—Belting, balata, rubber goods, except tires	Agency
7015	France—Jointings and packings	Agency
7024	Poland—Tires	Purchase and Agency
7032	Hungary—Tires	Purchase and Agency
7039	Italy—Industrial chemicals, for paper, rubber, textiles, soap and tanning	Agency
7050	Argentina—Druggists' rubber sundries	Agency
7058	Mexico—Rubber heels	Purchase
7105	South Africa—Crêpe rubber for tennis and golf shoes	Agency
7121	England—Rubber boots, hip and short	Purchase
7122	France—Men's raincoats	Purchase and Agency
7146	Algeria—Rubber shoes and other rubber articles	Purchase
7169	Italy—Rubber belts	Purchase
7172	Switzerland—Pneumatic truck tires and tubes	Purchase
7175	France—Surgical goods	Agency
7219	Scotland—Toy balloons and nipples	Purchase and Agency
7222	Chile—Rubber boots	Agency
7237	Netherlands—Rubber hose	Purchase
7247	Norway—Fire and garden hose	Agency
7256	Austria—Rubber soles and heels	Agency
7268	Martinique—Automobile tires	Purchase and Agency

Trade Lists Available

Mimeographed copies available on reference to titles and file numbers.

Number	Country	Commodity	Firms
BE—1031—A	Canada	Rubber goods	Importers and dealers
EUR—12035—A	Sweden	Rubber goods	Importers and dealers
LA—15011—A	Ecuador	Rubber goods	Importers and dealers

Foreign Tariffs

Canada

Among the many new and amended items forming part of the Canadian customs tariff, as effective from May 12, 1923, appear the following:

Tariff Items		British Preferential Tariff Per Cent	Intermediate Tariff Per Cent	General Tariff Per Cent
542*b*	Fabrics of cotton or other fiber including cord fabric, for use in the manufacture of pneumatic tires	15	17½	20

Mexico

According to two presidential decrees the duties on certain motor parts now imported into Mexico are considerably modified. Among these changes are the following:

No. in Import Tariff	Article	Rate of Duty Pes.	Cts.
633 A	Pneumatic tires, not specified (in the tariff), and inner tubes therefor, of india rubber, *per kilog. gross*	2	00
633 B	Solid tires of india rubber, even if perforated, *per kilog. gross*	1	00
633 E	Pneumatic tires, of india rubber, when each tire weighs more than 4,400 and up to 10,000 grs. net, or more than 600 and up to 1,500 grs. net, *per kilog. gross*	1	50

CANADIAN PARAMOUNT RUBBER CO. FORMED

The Paramount Rubber Co., Limited, Sherbrooke, Quebec, Canada, recently organized to develop Canadian business, represents a subsidiary of the lately amalgamated interests of the Paramount Rubber Co., Little Falls, New Jersey, and the Hodgman Rubber Co., 25 West 43rd street, New York, N. Y. The Canadian company, which will soon commence production, will take over the plants of the Regal Rubber Co. at Sherbrooke, and will handle some large contracts in the Canadian field recently secured by the American organization.

Rubber Lined Ball Mills

A New Use for Rubber—Ball Mills with Rubber Lining Outwear Steel—Construction and Production Advantages

Two Types of Ball Mills

BALL mills are extensively used in the mining industry for breaking up ores. There are two types of mills in common use; the principal one is the cylindrical ball mill that ranges in diameter from 5 to 6 feet and from 16 to 22 feet in length. These mills are practically steel shells that vary in thickness from 5/8 to 3/4 of an inch and are provided with heads at each end to which the heads are fastened that carry the bearings upon which the shell revolves. The other type is known as the conical mill, which is comparatively short but in diameter it ranges from 10 to 12 feet. The body of this mill is usually constructed of gray iron or steel castings.

Steel Protective Linings

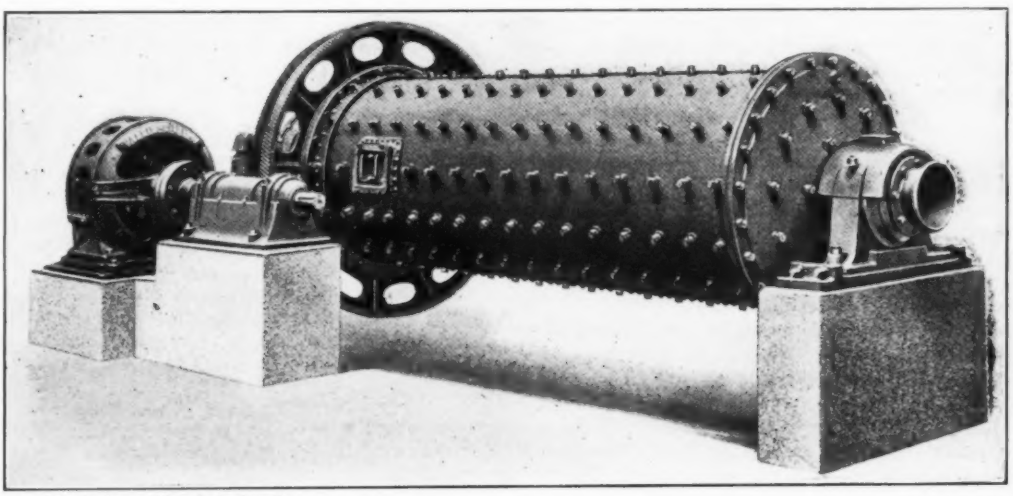
Both types of mills are fitted with inside linings which may be removed when worn. The object of these linings is to protect the main shell against wear. In order to resist the abrasive action of the ore, these linings are chrome or manganese steel castings that vary from 2 to 3 inches in thickness and are therefore quite heavy. This means considerable cost for material and also for power required to drive the mill. The principal objection to the use of steel linings is due to the fact that they gradually wear out the shell due to the constant friction between the lining and shell, aggravated by small particles of the reduced ore. The cost of a perfect fit between the heavy castings of the lining and the shell, is prohibitive. This is clearly true of both the cylindrical and conical types of ball mills. Indeed, this condition is so serious that the tendency is toward making cast steel shells of 1½ inches in thickness and over in order to insure long life despite increased cost, weight, and greater power consumed.

In comparatively small installations there are 4 to 6 ball mills in operation, while larger plants have from 10 to 20 and sometimes 30 mills or more. The shut-down for replacing steel linings in a mill requires two days at least. In the case of a mill handling 100 tons per day of a recoverable mineral value of $10 per ton, a production loss of $2,000 per mill is the result of this loss of two days' time. As a rule linings are replaced three times in two years and therefore the production loss per mill per year amounts to $3,000.

Briefly stated the objections to the use of metal linings are as follows: Cost, weight, increased driving power, abrasive wear on the shell, shut-downs and cost for replacement of parts.

Advantages of Rubber Linings

Experimental ball mills are now in operation wherein sheets of rubber are being used in the place of the ordinary steel linings. These rubber sheets are approximately 7 to 8 feet long and about 16 inches wide and 5/8 of an inch thick. These rubber sheets are made in convenient size and afterwards cut to fit the inside dimensions of the mills.



Allis-Chalmers Manufacturing Co.

Ball-Peb Granulator

The advantages of using rubber sheets in ball-mill construction are as follows:

1. The lining weight is greatly reduced, hence less power is required for driving the mill. On the basis of power per ton of finished product the comparison between steel and rubber is in the ratio of about 17 to 13 or a saving of nearly 24 per cent. There is less load on the bearings, which last longer.

2. Due to moisture in the ore and introduced with it, the inside of the shell is soon covered with rust, to which the rubber lining freezes, holding it firmly in place and eliminating friction between the lining and shell.

3. The advantage under paragraph 2 prolongs the life of the shell.

4. The initial as well as the up-keep costs are greatly reduced. Chrome or manganese liners 2 to 3 inches thick cost about 11½ cents per pound. Rubber will cost from 55 to 70 cents per pound. The difference in weight will all be in favor of rubber.

The advantages in favor of rubber from the production standpoint are:

1. The capacity of tube or ball mill is in proportion to its diameter. The replacement therefore of a metal lining 2 to 3 inches thick by a rubber lining only 5/8 inch thick very materially increases the output.

2. In a metal-lined mill the ore as well as the balls slide readily over the inside surface; not so in a rubber-lined mill.

Observations have shown that in a rubber-lined mill the working zone is materially increased and the inert zone reduced. This is assumed to be due to the fact that the ore and ball mass, pressing against the rubber, is prevented from sliding and does useful work.

3. Experience has shown that a rubber lining averages 13 months of usefulness before it has to be replaced as compared with 8 months for a steel lining.

4. The relining of a mill with rubber is a very simple operation. A mill can be relined in one-half day or in one-quarter the time consumed when using steel linings.

Due to the limited weight of the rubber strips they are readily removed and the new ones rolled up are introduced through the manhole into the mill. Cost of labor in relining is thus cut down.

5. More important than the last consideration, however, is the fact that the rubber-lined mill at the time of relining is kept out of production only one-half day as against two days for a steel-lined mill, steady production being of prime importance.

Rubber Linings in Operation

The use of rubber for mill linings is at present being demonstrated at the mills of a prominent mining company, where a mill completely lined with rubber 5/8-inch in thickness, is in operation. The mill has been in uninterrupted operation for 3 months, but no appreciable wear of the lining is noticed. The ore handled was of medium abrasive quality. The process has evidently passed the experimental stage and seems established. At present a mill is being fitted out for coarser work, taking ore at 2 inches diameter and reducing with large balls to ½-inch and finer.

Patent applications covering this invention have been made in the United States, Canada and other foreign countries.

Estimating Costs of Mechanical Rubber Goods—II[1]

Machine, Hand Made, and Reinforced Hose—Specifications—Calculation of Estimates—Material and Labor Costs

By Joseph J. Dawson

Hose Room Costs

WE have previously discussed the estimating of costs for departments which are necessary to all phases of the rubber industry, namely, all departments up to and including calendering.

It is the purpose of this article to give a comprehensive idea of the various steps necessary to properly estimate costs for any type of rubber hose. In cases where it is impossible to obtain samples and actual weights of hose before the cost is estimated, and such cases are in the vast majority, it is necessary to estimate weights before costs can be calculated. This condition resolves itself into a geometrical problem and practically all the geometrical formulæ for the cylinder are applicable.

Let us consider the types of hose manufactured. They are divided and subdivided as follows:

1. Machine made hose.
2. Hand made hose.
   (a) Smooth bore hose, suction.
   (b) Rough bore hose, suction.
   (c) Dredging sleeves.
3. Hose reinforced outside with some material such as (a) wire, (b) marlin, (c) armor.

In treating these various classes we will take into consideration only the most complicated specification in each class and think of the hose as a hollow cylinder 100 feet long.

There are three things to be considered in making an estimate, namely: Material, labor, and overheads. As explained in a previous article, it is not intended to endorse any particular method of computing overheads. We will leave this phase of the estimating to the decision of those interested in the contents of this article and deal only with the material and labor items of the work.

Herewith is shown a convenient form for use in compiling the data making up the cost estimate. This form may be printed on card stock or on a good grade of ledger bond and punched for use in ring binders. The tabs across the top of the form may be cut to provide a proper filing index.

Provision is made for three different estimates when markets or labor conditions change to such an extent as to make new records necessary.

The development department furnishes the estimating department with the specification of the hose on which the estimate is to be made. As all hose costs are estimated on a basis of 100 feet, we will first determine the weight for each material used, of a piece 100 feet long by 1 inch wide. This figure will be called the coefficient in all subsequent explanations.

We will now consider each class of hose as previously classified and show how the estimate of weight is made for each section of the specification.

Machine Made Hose

½-INCH 4/1 PLY, AIR DRILL HOSE

Tube — ..... .125	Cover —..... .030
14 oz. — ..... 4 ply	Duck cover — .. 14 oz. 1 ply

The tube is treated as a hollow cylinder 100 feet long, ½-inch inside diameter by ¼-inch outside diameter. The volume of a ¼-inch cylinder is first determined and the volume of a ½-inch cylinder is deducted therefrom. This figure multiplied by .0362 pounds, the weight of a cubic inch of water, gives the water weight of the tube; multiplied by the specific gravity of the stock used gives the weight of the tube.

From the friction ratio which we explained in the previous article and upon the importance of which a great deal of stress was laid, the coefficient for the 14-ounce duck is determined. This coefficient is arrived at in the following manner: The weight of 1200 square inches of duck is figured from the standard weight of the duck as purchased. This figure multiplied by the friction ratio gives the weight of friction or skim that is put on by the calenders. The two added together give the coefficient for the frictioned duck. A convenient formula for this work, which is mathematically correct is:

$$\frac{1 + \text{Ratio}}{\frac{1}{2} \text{ width of duck}} \times \text{oz. weight per yd.}$$

After determining the coefficient it is necessary to know the cut or width of duck to be used to make the hose 4-ply.

[1] Continued from THE INDIA RUBBER WORLD, July 1, 1923, 629, 630.

This cut should be calculated and furnished the cutting department for use when the hose is actually made. If found to be incorrect at that time—but it should not be—corrections and allowances should be made for use on future estimating. A good formula for calculating this cut is:

1.57 × plies × (diam. of hose under duck + diam. of hose over duck) + ½"

This cut multiplied by the coefficient gives the weight of frictioned duck in the hose.

For estimating the weight of the cover the volume of a piece 100 feet by 1 inch by .030 is figured and multiplied by .0362 pounds and then by the specific gravity of the stock used. This coefficient is then multiplied by the cover cut, which is determined as follows:

(Diam. of hose over cover × 3.1416) + ¼"

The cut for the single ply of 14-ounce duck used as an additional cover is figured the same as a cover cut except that a ½-inch lap is usually used. If more than one ply of duck is used on the outside of the rubber cover the same procedure as that used in determining duck cuts is followed. The weight of this outside duck is figured the same as that used in the body of the hose.

Hand Made Hose

3-INCH, S. B. SUCTION

Tube —	.060	Filler —	½" × .135
Skim on tube —..	010	2nd tube —	.030
Round coppered steel — 10 gr. ½ inch spacing		18 oz. duck —	3 ply
		Cover —	.040

This specification develops two new conditions which were not explained when describing machine made hose, namely, the wire and filler. The tube, skim, and second tube are considered as tubes and figured the same as a tube.

The duck and cover are figured as previously explained. In estimating the weight of wire used the calculation is made using the mean diameter of the wire; that is, the diameter of the hose under the wire plus the thickness or diameter of the wire. The formula for the wire weight follows:

$$\frac{\text{1,200 inches}}{\text{width of wire + spacing}} \times \text{circumference of hose in feet} \times \text{wt. of 100 feet of wire}$$

The filler formula is similar except that the weight must be calculated from the specific gravity of the stock used.

$$\frac{\text{1,200 inches}}{\text{width of filler + spacing}} \times \text{circumference of hose in inches} \times .0362 \times \text{sp. gr.}$$

R. B. suction hose and dredging sleeves are estimated by the same formulæ as explained and as it is our purpose to give only a general explanation of the work it will be necessary for the estimator to use his judgment as to the treatment of each case.

When wire or marlin is used as an outside reinforcement it is figured in exactly the same manner as if used in the interior construction of the hose. In the case of armor it is best to use the actual weight of a foot as a basis.

Material and Labor Costs

Having completed our estimate of the weight of 100 feet of hose, the material cost is calculated by using the prices for compound gum stock and friction stock as explained in the previous article covering the departments preparing these materials, and in the case of wire or other materials at the market price.

No.	No.	No.	No.	No.	No.	No.	No.	No.	No.
ARTICLE					QUANTITY				SPEC. NO.
CUSTOMER					INQ. NO.		SAMPLE NO.		F. O. NO.

CONSTRUCTION				WEIGHT		DATE		DATE		DATE		CONSTRUCTION			WEIGHT		DATE		DATE		DATE	
SIZE AND PLY	COMP. NO.	GAGE	CUT	C.E.	POUNDS	LB. COST	TOTAL COST	LB. COST	TOTAL COST	LB. COST	TOTAL COST	SIZE AND PLY	COMP. NO.	GAGE	CUT	C.E.	POUNDS	LB. COST	TOTAL COST	LB. COST	TOTAL COST	LB. COST	TOTAL COST

Form for Compiling Cost Estimating Data

The labor and manufacturing overhead for cutting, tubing, soling, making, wrapping, curing, stripping, cleaning and rolling, are then added and to this figure, which is the factory cost, are added the selling and administrative overheads, which result is the complete estimate of the hose cost.

DETECTOR FOR OVERHEATED BEARINGS

A very effective means of detecting the presence of overheating in a bearing is found in the color change from vivid scarlet vermilion to black in a special detector paint applied to the place to be kept under observation. The detector material consists of a mixture of about 85 per cent copper mercuric iodide and 15 per cent of the double iodide of silver and mercury, applied as a paint in white shellac spirit varnish.

In applying the detector, first paint a circle of zinc white paint on the bearing or place to be kept under observation. The detector paint is then applied as a vivid red bull's eye within the white circle. In case the detector is to be applied to a shaft a broad band of white paint is located on the shaft near a bearing, with a narrower band of the red detector paint in the middle.

In any case, after the paint is dry it should be protected with a coat of colorless oil proof varnish, so that the surface may be kept wiped free from dirt. When the paint changes color there is something wrong, and generally speaking it will be found that if the matter is taken in time no damage will be done by overheating. —H. T. Pinnock in the *Journal of Society Chemical Industry*.

NEW ZEALAND AS A BUYER OF AMERICAN TIRES

Although Australia's purchases during 1922 of our rubber goods of all classes amounted to $1,377,706, while those of New Zealand totaled only $1,002,200, the latter country's importations of our automobile tires reached a value of $692,137, as compared with Australia's similar importations, valued at only $667,881. New Zealand has already taken, during the first four months of the present year, shipments of our tires estimated at $465,379.

The United States Tire Industry

Tire and Tube Production—Rubber Consumption—Tires for Original Equipment—Tires in Use—Exports of Tires

STATISTICS gathered and prepared by THE INDIA RUBBER WORLD from the reports of the United States Department of Commerce, the Rubber Association of America and the National Automobile Chamber of Commerce show the tremendous advance of tire production in the United States during 1922, following the general business depression which so adversely affected tire demand in 1920 and 1921 and motor vehicle manufacture in 1921, the latter owing partly to over-production in 1920. They show how greatly last year's tire business exceeded the previous record year 1919, and indicate conclusively that the billion dollar mark in our tire business has been crossed.

As in the past it is evident that the phenomenal growth of our tire industry is due to the enormous and steadily increasing use of motor vehicles for both business and pleasure, as indicated by the rapidly advancing motor vehicle registration in recent years and the fact that little more than 2½ per cent of the American tire product is being exported. The United States consumes practically all the tires it makes.

American Motor Vehicle Registration

The registration of motor vehicles in the United States during recent years has been as follows:

Year	Automobiles	Motor Trucks	Totals	Gain Number	Gain Percentage
1914	1,666,984	44,355	1,711,339	.....	..
1915	2,372,696	72,968	2,445,664	734,325	42
1916	3,394,314	118,682	3,512,996	1,067,332	43
1917	4,792,205	191,135	4,983,340	1,470,344	41
1918	5,852,726	293,891	6,146,617	1,163,277	23
1919	7,143,954	421,692	7,565,646	1,419,029	23
1920	8,174,129	*1,003,000	9,177,129	1,611,483	21
1921	9,345,485	*1,118,520	10,464,005	1,286,876	14
1922	10,863,389	*1,375,725	12,239,114	1,775,109	17

*Motor trucks and commercial cars.

During the year 1922, 12,239,114 motor vehicles, exclusive of 182,762 motorcycles and 29,355 trailers, were registered in the United States, of which number 10,863,389 were passenger cars and 1,375,725 were motor trucks. This represents a combined gain of 17 per cent over the 1921 registration, or a gain of 16 per cent in passenger cars and nearly 23 per cent in motor trucks. There is now one automobile to every nine persons in the United States, and one to every four persons in the state of California.

New York leads the states with a registration of 1,002,293. California follows with 861,807 and Ohio is a close third with 858,716. Five states—New York, California, Ohio, Pennsylvania and Illinois, named in their relative order—have over one-third of the total registration of the whole country. Their 4,334,527 motor vehicles are nearly double the combined registration of the world, exclusive of the United States, and which totals 2,268,474, a gain of 9 per cent over 1921. New York has the largest gross gain of 190,262 and Louisiana the largest percentage gain of 31.3 per cent.

Of the entire world registration of passenger cars and trucks, numbering 14,507,588, 84 per cent are in the United States. In other words, there are nearly 6½ times as many cars in operation in the United States as in all the rest of the world.

Assuming five tires per car as the average consumption of fabric tires in 1913 and 2½ tires per car as the present consumption, owing to the wide use and long life of cord tires, the American tire demand for replacements has grown from about 6,275,000 in 1913 to about 30,597,785, or nearly five times that of 1913, despite the greatly decreased consumption per car. On the same basis the replacement tire demand for the rest of the world is only 5,671,185 tires, making a grand replacement total of 36,268,970.

American Tire and Tube Production

During the past nine years the American pneumatic tire and tube production, actual and estimated, has been as follows:

PNEUMATIC TIRE AND TUBE PRODUCTION

	1914	1915	1916	1917	1918	1919	1920	1921	1922
Casings	*8,983,000	*12,840,000	†18,500,000	†25,850,000	21,600,000	33,000,000	31,500,000	27,267,000	38,200,000
Tubes	.....	.....	†16,785,000	†23,256,000	*20,000,000	*35,000,000	*33,000,000	*34,000,000	*48,000,000

*Estimated. †Under 6 inches.

It is estimated that 993,020 solid tires were produced in 1922, against 529,790 in 1921, an increase of over 85 per cent.

The year 1922 marked a big advance in pneumatic tire production, the increase in casings being 40 per cent and in tubes 41 per cent over 1921, or an increase of over 15½ per cent in casings and 37 per cent in tubes over the previous record year 1919.

In 1917, the last year prior to government curtailment of tire manufacture, production increased to nearly three times the output for 1914. Although production in 1918 was curtailed over 16 per cent of the 1917 casing output and over 14 per cent of the tube output, the 1919 production showed an increase above the 1917 record of over 27 per cent in casings and over 50 per cent in tubes. In 1920, owing to the general business depression, casing production decreased over 4½ per cent and tube production over 5½ per cent, while the following year casing production fell off nearly 13½ per cent more but tube production increased over 3 per cent.

Value of the American Pneumatic Tire Output

At an average of $25 per tire the retail value of the 1922 product of casings was about $955,000,000, to which may be added $144,000,000 for the tube production at an average of $3 per tube, making a total of $1,099,000,000 for the American pneumatic tire and tube output of the calendar year 1922. It seems certain that the billion dollar mark in our tire business was crossed last year.

American Crude Rubber Consumption for Tires

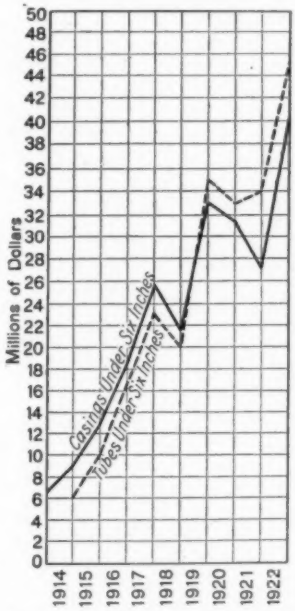
For the manufacture of the tires and tubes mentioned above the consumption of crude rubber was as follows:

	*1920 Pounds	*1921 Pounds	*1922 Pounds
Automobile and motor truck casings	240,000,000	234,500,000	360,000,000
Inner tubes	60,000,000	67,800,000	93,000,000
Solid tires	30,000,000	21,100,000	45,000,000
Other tires and sundries	12,000,000	5,000,000	12,000,000
Totals	342,000,000	334,400,000	510,000,000

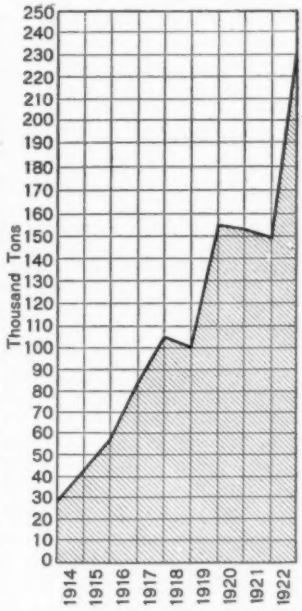
*Estimated

Only the estimated total weights are available for the years 1913-16. They are, in pounds: 1913, 65,880,000; 1914, 89,830,000; 1915, 128,400,000; 1916, 185,649,570. The total 1917 consumption was 233,386,796 pounds, and the estimated consumption in 1918 and 1919 was 248,000,000 and 348,000,000 pounds, respectively. As compared with these figures, only 51,034,500 pounds of rubber was required to manufacture the 5,103,450 tires required to meet the 1922 world demand exclusive of the United States, assuming 10 pounds of rubber per tire.

In 1922 the American crude rubber consumption for tire manufacture showed an increase of 52½ per cent over 1921 and 31½ per cent over the previous record year 1919. The amount used was nearly 7¾ times the 1913 consumption for this purpose and more than double the 1917 consumption. In other words, about 78 per cent of the total rubber imports into the United States and



Pneumatic Tire and Tube Production



Crude Rubber Consumed in Tires and Tubes

80 per cent of the rubber consumed for all purposes in this country in 1922 was used for tire manufacture, as compared with 79½ per cent and 73 per cent respectively in 1921. In 1920, 65 per cent of the total United States rubber imports were used for tire manufacture; in 1919, 68 per cent; in 1917, 75 per cent, and in the fiscal year 1913, 58 per cent.

American Tire Demand for Original Equipment

The accompanying statistics of motor vehicle production in the United States indicate the increasing number of tires, mostly pneumatic, required annually for original equipment.

MOTOR VEHICLE PRODUCTION

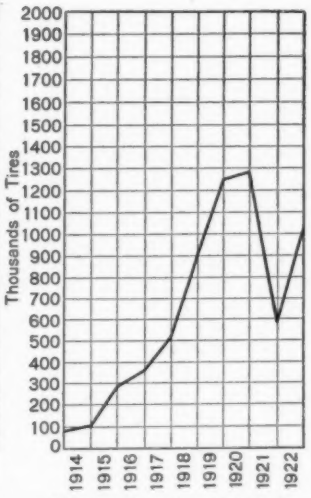
Year	Passenger Cars	Motor Trucks	Totals
1913	461,500	23,500	485,000
1914	543,679	25,375	569,045
1915	818,618	74,000	892,618
1916	1,493,617	90,000	1,583,617
1917	1,740,792	128,157	1,868,949
1918	926,388	227,250	1,153,638
1919	1,657,652	316,364	1,974,016
1920	1,883,158	322,039	2,205,197
1921	1,514,000	147,550	1,661,550
1922	2,406,396	252,668	2,659,064

Tire production for original equipment in 1922 was 3,990,056 tires or 60 per cent more than in 1921, and 1,815,468 tires or 20 per cent more than for the previous banner year 1920, the 1921 demand having been 2,174,588 tires or 24 per cent less than in 1920. It is seen, therefore, that while 1,940,000 tires sufficed for original equipment in 1913, no less than 10,636,256 were required in 1922, an increase to nearly 5½ times the 1913 requirements.

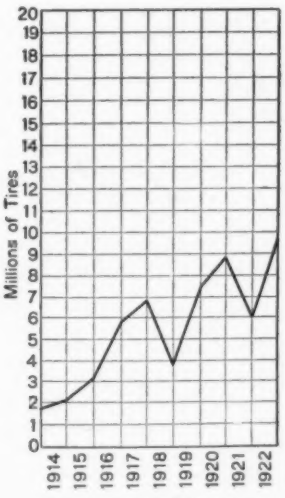
Examination of the table above indicates how the production of passenger cars and correspondingly of pneumatic tires under six inches was curtailed by the war situation of 1918, and the production of trucks and truck tires stimulated. It also shows the effect of the business slump in 1921 and the gain last year.

Pneumatic tire production for the original equipment of passenger cars advanced steadily from 1,846,000 in 1913 until in 1917 it reached 6,963,168, and then fell the following year to 3,705,552, owing to war curtailment. For 1920 the demand advanced to 7,532,632, exceeding the 1917 record by 569,464, but owing to the business slump in 1921 again fell off to 6,056,000. The 1922 demand totaled 9,625,584, or nearly 5¼ times that of 1913.

Truck tire production for original equipment showed continuous growth during and since the war period until in 1920 it had become 1,288,156, or over 13½ times the 1913 demand. In 1921 the



Truck Tires for Original Equipment



Passenger Car Tires for Original Equipment

business slump forced it down to 590,200, a drop of 54 per cent, but for 1922 the demand advanced to 1,010,672, an advance of over 70 per cent.

The 1923 Tire Demand for Original Equipment

As to the 1923 production of motor vehicles and tires for original equipment, estimates as usual vary widely. It was commonly stated at the beginning of the year that 3,000,000 motor vehicles would be manufactured this year, indicating the need of 12,000,000 tires for original equipment, and it seems unlikely that this estimate will be exceeded. Production for the first four months of this year was at the rate of over 3,750,000 cars annually, while for the ten months up to and including April it was at the rate of over 3,200,000 cars annually, but in recent months production has been slowed down considerably and it now appears likely to be still further reduced.

While 2,659,064 motor vehicles were manufactured in 1922, the increase in registration for the year was only 1,775,109. The difference of 883,955 is 376,164 more than the average 507,791 loss in cars abandoned, exported or not sold for the three years prior to 1922. It seems likely, therefore, that some 200,000 to 300,000 cars of the 1922 production were not sold until this year, a fact which must not be lost sight of in estimating the probable 1923 output.

Last year's total registration increase was 17 per cent, and it seems improbable, good as general business has been, that this year's registration will represent an advance of more than 20 per cent, indicating an increased registration of 2,443,823 new cars. To this should be added some 601,832 cars, the average loss in cars abandoned, exported and unsold for the past four years, making a prospective production total of about 3,045,655 cars, of which the probable ratio will be 2,700,000 passenger cars to 345,000 motor trucks. Total production of motor vehicles for 1923 may, there-

fore, be conservatively estimated at 3,000,000, requiring 12,000,000 tires for original equipment.

Tires in Use in the United States

Of the 12,239,114 motor vehicles registered in the United States during the calendar year 1922, 1,375,725 were trucks and commercial cars, so that nearly eight times as many pneumatic tires under six inches as truck tires were in use last year, the number of each sort, exclusive of spares, being approximately 43,453,556 pneumatics under six inches and 5,502,900 truck tires. One additional tire per car would be a conservative estimate for spares, making the totals 54,316,945 pneumatics and 6,878,625 truck tires, many of them also pneumatics, or a grand total of 61,195,570 tires in use in the United States last year.

On the basis of 10 pounds of rubber average per tire and 50 pounds of rubber per car for regular equipment and one spare tire, a total of 611,955,700 pounds of rubber was consumed in manufacturing the tire casings in use in the United States last year, an amount equal to over 90 per cent of the total rubber imports of the United States for the calendar year 1921, which totaled some 650,772,800 pounds. On the same basis, only 113,423,700 pounds of rubber were consumed in manufacturing the tire casings in use in the entire world exclusive of the United States, an amount less than one-fifth of the American consumption for the same purpose.

United States Tire Exports

Export tire trade improved somewhat during 1922 in each of the grand divisions except North America, as shown by the following statistics compiled by the Bureau of Foreign and Domestic Commerce. Total tire exports to all countries for 1922 were valued at $19,898,412, against $15,954,515 in 1921, a gain of nearly 25 per cent, though this was only 56 per cent of the $35,082,327 total for the record year 1920. Lower prices, however, account for part of the decline since 1920.

The tires exported in 1922 consisted of 1,326,220 automobile casings, 936,718 automobile inner tubes, 54,931 other casings, 40,363 other inner tubes, and 55,665 solid tires for automobiles.

Total tire exports to all countries fell off in 1914, but gained in 1915, jumped during 1916 to about 4¼ times as much as in 1913, dropped considerably in 1917, but advanced thereafter until 1920, when they were over ten times the 1914 total.

American trade maintained a continuous and remarkable growth from 1914 to 1920, inclusive, the value of the 1920 exports being more than 64 times that of 1914. In 1921 this business decreased nearly 76 per cent, but gained over 37 per cent last year.

Exports to Africa grew steadily until 1918, when their value reached some 104 times that in 1914, but showed a falling off of about 7¾ per cent for the calendar year 1919 as compared with the fiscal year 1918. The 1920 business, however, increased to over four times the value of that in 1919, but in 1921 fell off over 81 per cent. Last year exports to Africa more than doubled.

European exports have fluctuated greatly owing to the war, the exchange situation and economic conditions generally. In 1914 they decreased a little, but increased considerably in 1915 and in 1916 jumped to more than five times their value in 1913, after which they declined steadily, the value of the 1918 shipments being only about 74 per cent of the 1913 value. The 1919 exports, however, exceeded those of 1916 by more than 8 per cent, but the 1920 exports fell off over 65 per cent. Since then exports to Europe have steadily increased. Last year a gain of over 22 per cent was made, and the total for the year was nearly 64 per cent of the 1919 record.

Total Estimated Tire Demand for 1923

It is estimated that the 12,239,114 motor vehicles registered in the United States in 1922 will require about 30,597,785 tires to replace those worn out at the annual rate of 2½ tires per vehicle. To this may be added the 12,000,000 tires likely to be required as original equipment for the estimated 1923 production of some 3,000,000 passenger cars and motor trucks, and also 3,000,000 spare tires which individual owners of these new cars will buy, making a total visible demand for 45,597,785 tires. Approximately the same figure is obtained by adding 20 per cent to last year's tire production of 38,200,000 corresponding to the 20 per cent estimated increase in motor vehicle production, the result being 45,840,000. Every indication therefore points to another tire production record this year.

On the same basis as above it is estimated that the 2,268,474 motor vehicles registered throughout the world, exclusive of the United States, will require about 5,671,185 tires to replace those worn out at the annual rate of 2½ tires per vehicle. To this may be added the 907,388 tires likely to be required as original equipment for the estimated 1923 production of some 226,847 passenger cars and trucks, which is an increase of 10 per cent as compared with 9 per cent last year, and also 226,847 spare tires which individual owners of these new cars will buy, making a total visible foreign demand for 6,805,420 tires. This added to the requirements of the United States indicates a grand total demand for 52,403,205 tires for the world.

AUTOMOBILE TIRE EXPORTS

Exported to:	1914*	1915*	1916*	1917*	1918*	1919†	1920†	1921†	1922†
Europe	$1,764,240	$2,745,450	$10,992,184	$3,480,114	$1,460,518	$11,907,480	$4,124,210	$5,895,215	$7,614,159
North America	1,254,200	1,187,632	2,184,874	3,186,265	4,474,713	5,188,317	9,346,968	4,632,588	4,608,248
South America	115,387	214,068	1,050,398	2,596,936	3,432,181	4,986,024	7,391,010	1,785,363	2,863,701
Asia	64,173	73,430	477,895	810,300	1,194,551	2,970,464	5,081,831	1,524,811	1,988,747
Oceania	279,327	702,877	2,896,401	1,832,244	2,662,422	3,177,431	6,218,151	1,565,934	1,703,762
Africa	27,940	39,813	334,475	424,342	753,286	694,943	2,920,157	550,604	1,119,795
Totals	$3,505,267	$4,963,270	$17,936,227	$12,330,201	$13,977,671	$28,924,659	$35,082,327	$15,954,515	$19,898,412

*Fiscal year ended June 30. †Calendar year.

A study of the accompanying figures reveals several facts of interest, particularly the remarkable growth from 1914 to 1920 of tire exports to the entire world, notably to South America, Asia, Oceania and Africa. The combined value of the 1920 business in the four divisions named was over 44 times the value of these exports in 1914. Tire exports to Asia increased constantly until 1920, when they were over 79 times the 1914 total. In 1921 they dropped nearly 70 per cent, but increased 30 per cent last year. Exports to Oceania fell off in 1917, but the following year had nearly reached the high mark of 1916. In 1919 there was a substantial increase and in 1920 exports nearly doubled, but fell off nearly 75 per cent in 1921. Last year there was an increase of nearly 8¾ per cent.

North American exports were adversely affected in 1914 and 1915, but thereafter grew steadily until 1921, when they dropped nearly 50 per cent and fell off a little more last year. The South

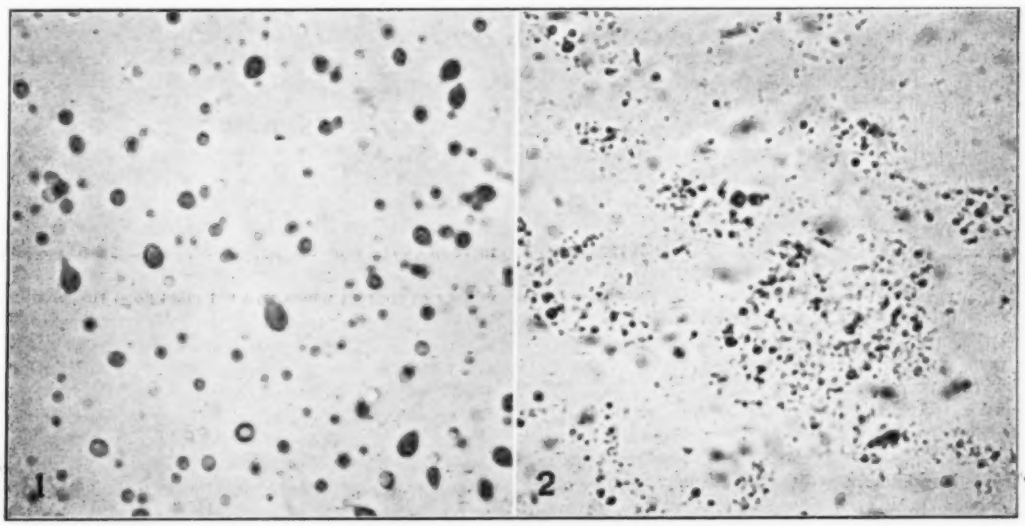
AIR BAG DETERIORATION

Air bag deterioration, due to progressive oxidation of the rubber molecule with each successive cure, can be greatly reduced by substituting CO_2 for air as the inflating medium. In a recent test run on 30 by 3½ cord tires, 43 per cent more cures were obtained by the use of carbon dioxide.

Studies on Rubber Latex[1]

Properties of Latex—Types of Particles—Latex Concentration—Coagulation Methods

IN view of the wide-spread interest in the use of latex, inspired by the patents and articles of Ernest Hopkinson of the United States Rubber Co. and the patent of Frederick Kaye on the use of latex in the paper industry, and of the lack of definite information regarding the characteristics and peculiarities of rubber latex, this subject would appear to be a fertile field for research. The present work was undertaken with the idea of obtaining as broad a viewpoint as possible on the physical and chemical properties of latex and as to how they could be utilized in various industries. Much of both scientific and technical interest has been learned, and a number of patents both domestic and foreign have been applied for.



MAGNIFICATION 1980 DIAMETERS

Fig. 1—Rubber Particles in Centrifuged Latex—Concentrated Fraction. Fig. 2—Rubber Particles in Centrifuged Latex—Diluted Fraction

Properties of Latex

In going over the work we will first give a brief description of latex and its properties and will then take up the various methods by which its physical and chemical properties may be altered and various rubber mixtures that can be obtained through its use. Finally we will take up various industrial applications of latex that appear promising.

All of our work has been done on *Hevea brasiliensis* latex from the Malay Peninsula, which was shipped into this country, preserved with about 0.5 per cent of NH_3. Part of this NH_3 is free and part appears to be combined as an ammonium proteinate or ammonium salt of some resinous fatty acid. It serves two purposes: First, to prevent the action of bacteria, and second, to keep the latex faintly alkaline, which adds to its stability. Latex consists of a colloidal solution of rubber in water varying in rubber content from 20 per cent in young trees to 40 per cent as a maximum. All the samples received have run from 30 to 38 per cent of rubber. It also contains about 2 per cent of protein, 1.65 per cent resin, and some sugars.

Considerable discussion has been aroused over the question of what acts as the protective colloid—the protein, or the resin; and it is quite possible that they both function in this respect. It has also been stated that the non-caoutchouc materials are valuable components of crude rubber and add to the quality of the finished product. Mr. Hopkinson's patent on spray-drying latex has this feature in mind. The protein with its amino grouping does exert a catalytic or accelerating effect upon vulcanization but the effect of uncertain quantities of unknown resins and protein material upon rubber mixes is something which will require considerable further study.

Latex Particles

It has been pointed out by Henri that latex particles average about 2 microns in diameter, and five different types of particles have been classified by him. The accompanying microphotographs clearly show the difference in size. The peculiar pear shape of the larger particles, and the tail at the small end, clearly seen in Fig. 1, are most interesting, and, as far as the authors know, without parallel in the field of colloids. Particles of this size are just on the border line of Brownian movement, and aside from this, and end-for-end revolution, the pear-shaped particles seemed to have a very marked longitudinal vibration, rather vigorous in the small end. The effect of this was to give the field an extraordinary resemblance to a swarm of tadpoles. The nature and function of these tails have never been determined. It is possible that they are small particles attached by an opposite electrical charge to a larger one, but their appearance is that of a fine, straight line rather than a particle.

The particles seem to be elastic, as they distort when two particles approach in the first stages of coagulation. It has been noted that the latex particles carry a negative charge and will travel to the positive electrode. This has been proposed as a method of treating fabrics and has been tried as a method of coagulation. In general, all except the very weakest of acids will coagulate latex.

[1] *Courtesy of F. R. Henderson & Co., Inc., New York, N. Y.*

Metallic salts other than the alkalies also act as coagulants, but these act in a slightly different manner. Mechanical action such as rubbing will bring the particles together and this fact should be considered in all mechanical processes using latex. Pumping is fraught with the greatest difficulty, as many types of pumps are almost instantly stopped. We have also noted a decided tendency toward local coagulation when higher percentages of latex are added to paper pulp in a beater, as the beater action seems to bring the particles together. If it is necessary to resort to pumping, a "Monteju" is probably the safest type to use, although we believe that some success has been obtained with centrifugal pumps.

The addition of dry absorptive pigments will usually coagulate the latex, as will the addition of most organic liquids, such as alcohol or benzol. The type of coagulation with water-miscible liquids seems to be different from that obtained with the immiscible type, but the effect is the same.

At present the latex shipped into the United States available for experimentation and general use has been packed in five gallon kerosene tins, two tins to a case. This type of container has much to recommend it as it is airtight and readily handled. It is expensive and adds to the cost of latex when figured on a rubber basis, but should sufficient demand arise there is no question that latex could be shipped in bulk in tank steamers, as the United States Rubber Co. is now importing large quantities in this manner. In such a case the price should be very close to that of an equivalent amount of crude rubber.

Latex Concentration

Since it is difficult to obtain large and steady supplies of latex containing much more than 30 per cent rubber, and most of it from young trees on new plantations with much lower rubber content even than this, the problem of concentrating the latex to lower the transportation charges is a quite vital one. The material can be concentrated without coagulation by direct evaporation, preferably in a vacuum. It is best to add a trace of sodium carbonate or caustic soda to maintain a satisfactory alkalinity during evaporation. However, from small scale tests this method appears to have grave operating difficulties. In the first place there is a tendency to form a skin of rubber over the heating surfaces and surface of the liquid. There is also a great tendency to foam. It might be possible to subject the material to an incomplete spray-drying treatment, such as the United States Rubber Co. uses. If so, they have undoubtedly developed it, but nothing has been disclosed along this line.

Centrifugal action suggested itself as a possible angle of attack and several attempts were made to centrifuge the material. Ordinary methods being quite useless, we made several runs in the super-centrifugal machine of the Sharples Specialty Co., by courtesy of the company. Tests in a laboratory type machine turning at 30,000 r. p. m. quickly plugged the machine with a core of pasty material, uncoagulated, which would return to a latex upon the addition of water, and which showed a rubber content of 76 per cent dry rubber. The material was of the consistency of cream cheese and would coagulate upon the slightest pressure or rough handling.

From this we proceeded to a full-sized machine turning at 16,000 r.p.m. and passed a large quantity of material through it at various rates of flow. Using latex with an initial concentration of 36 per cent coagulable material, the best result we secured was a fraction containing 43.8 per cent coagulable material, with 31.9 per cent in the other fraction. Of the total amount of coagulable material present in the original latex, 24 per cent went into the concentrate or low specific gravity fraction, and 76 per cent into the dilute or high specific gravity fraction. Such a separation could hardly be called commercial, and we next endeavored to simulate a weaker latex by diluting the original 36 per cent latex with equal parts of water. By passing this material through the machine we secured a fraction containing 44.3 per cent coagulable material with a concentration of 8.1 per cent coagulable material in the other fraction. Of the total coagulable material present in the uncentrifuged material, 55 per cent went into the concentrate and 45 per cent into the dilute fraction. The nature of the rubber from these two fractions was quite different, the high percentage material giving a very tough, strong material, while the weaker latex gave a low grade rubber of little strength. We assumed that this was due to the concentration of the rubber in the light or high rubber fraction, and of the resins, sugars and other water soluble material into the heavy or low rubber fraction.

A microscopic examination of the fractions, as shown in Figures 1 and 2, shows that we had accomplished a rather complete separation of the particles, throwing the large particles into the concentrate and leaving behind the small particles. While the higher protein and resin content of the heavy, thin fraction may explain the difference in characteristics of the rubber, we believe that the difference in size of the particles also has a large influence on the character of the rubber.

The result of these experiments, while unsatisfactory from the standpoint of commercial concentration, seems to indicate a new method of handling and using latex. Such a separation might be useful when a fine particled material was desired, notably in impregnation where the greatest possible penetration is desired. It would therefore appear that the real field for the centrifugal treatment of latex is not in concentration but rather in the separation of latex into two fractions of distinctly different properties. Still more important is the apparent possibility of obtaining by this means a good grade of rubber from low quality latices from a variety of sources which will not yield good rubber by mere coagulation. As soon as material is available we expect to conduct some experiments with the latex of ordinary milk weed, to see if a good quality rubber can be obtained from it by this process. In other words, centrifugal force is a possible method for separating the rubber particles from protein, resins, and water soluble impurities of different dispersion from the rubber and also for classifying the rubber itself according to particle size.

It was at first thought that the method of partial coagulation which is described in detail later, offered a possible method of concentrating latex. However, the increase of viscosity of the material on partial coagulation is against its use for concentration. A highly diluted latex can be readily concentrated by partial coagulation within the limit of its reversibility and filtration, but the resulting cheese-like semi-solid product will still contain about 70 per cent of water. If much more water be removed by application of pressure, the mass coagulates to crude rubber. Partial coagulation therefore appears to hold out little hope as a method of concentration.

Another possible method of concentration is by electrolysis. As previously stated, the rubber particles travel with an electric current to the positive electrode. If this be covered with a semi-permeable membrane such as parchment paper or collodion, coagulation is prevented, and a thick paste of highly concentrated latex is deposited on the membrane. With suitable cell designs this method of concentration might be commercially feasible. However, we have developed another method of concentration which requires but little apparatus and is simple and certain in operation. Unfortunately, this cannot be disclosed until later, when the foreign patent situation has been straightened out.

Coagulation Methods

The work of Victor Henri on latex as given before the International Rubber Conference of 1908 is classic in the study of this material. Working with dialyzed latex he tried numerous coagulants and various strengths of acids and other mineral salts and distinguished between a true coagulation with acids and a gel-like formation with metallic salts other than the alkali group. In his work he failed to disclose any measurements of the hydrogenion concentration or pH, or the differences in behavior between

a preserved undialyzed latex and a dialyzed material. With a view toward commercial control and utilization we have worked with undialyzed latex containing the ammonia used for preservation and have studied the behavior of various coagulants at varying hydrogen ion concentrations. In this work we have used Clark and Lubs set of colorimetic indicators to determine the pH.

We have noted first that with acid coagulation, this takes place at about pH 5.5, or at about the middle of the methyl-red scale. All samples of latex submitted to us have this characteristic. We also noted a sample of latex which had been preserved with formaldehyde and had a broken gelatinous structure and this, too, showed the same pH value.

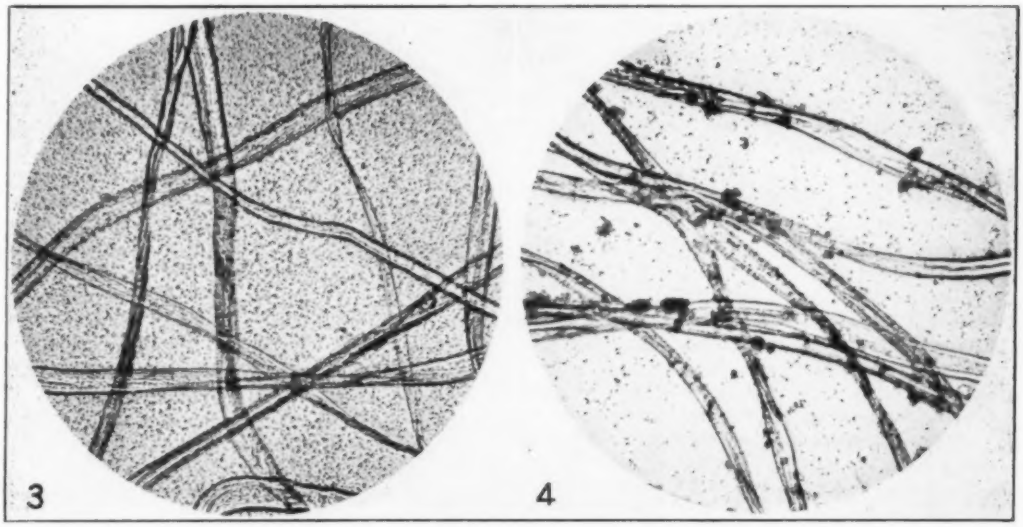
Dialyzed latex also shows this same pH value. It would be interesting to see what variation exists in actual pH value in the natural freshly gathered latex and to follow commercial coagulation with such a set of indicators or with a hydrogen electrode. It is possible that this might shed additional light on the standardization of output. All statements in the literature regarding the alkalinity of fresh unpreserved latex have expressed this value in cubic centimeters of alkali with phenolphthalein as an indicator.

This again raises the question of the functions of the protein and whether it is the protective agent or whether it is the newly isolated heveaic acid which does the work. The amphoteric character of protein is well known and in adding ammonia as a preservative we are forming an ammonium proteinate and an ammonium salt of heveaic acid, probably rather soluble salts of both these materials. Excess ammonia is necessary as a bactericide accounting for the large excess and high alkalinity necessary for the proper preservation. We already know the effects of such alkali soaps and alkaline proteins as protective colloids in other fields.

In view of the work on the subject and the conflicting theories we are inclined to believe that both materials have a decided effect and are more or less interdependent in their action. We have found that the addition either of protein, such as glue, gelatine or casein, or of alkali soaps increases the protective effect.

The gel formation noted by Henri upon the addition of metallic salts other than the alkali salts has been carefully studied. The phenomenon is probably the formation of the metallic soap of heveaic acid together with the precipitated metallic proteinate. By the addition of such strongly acid materials as sulphate of alumina, partial coagulation is gradually brought about with a continued change in the pH value, the value decreasing gradually through the coagulating point (pH 5.5), where a very stiff cheese-like material is obtained. Beyond this point reticulated lumps appear and the true rubbery coagulum is noted. On the other hand, if a truly neutral salt, such as zinc acetate, is used, the cheese-like structure appears almost instantly and the entire mass remains decidedly alkaline in its reaction.

It has also been pointed out that such a gel-like material can be stirred until the gel is entirely broken up and no longer resembles the original material from a physical standpoint. However, if such a violently agitated mass be allowed to stand it will reset to its original structure. Under a microscope the particles of a gel broken by stirring show that they are still agglomerated, as they maintain the group structure, and its action is still similar to the cheese-like material and not like untreated latex.



MAGNIFICATION 200 DIAMETERS

Fig. 3—Cotton Fibers in Latex. Fig. 4—Cotton Fibers in Partially Coagulated Latex

Temperature is an important item in the formation of this cheese-like material. The latex must be kept cold, as 30 degrees C. is sufficient to start incipient coagulation. Heating the material only slightly after the paste has been formed will also start a thickening action culminating in a complete coagulation. The strength of reagent used for the purpose is also important. In too great concentration, spots of true coagulum are likely to form where the drops of reagent strike the latex.

The action of such a cheese-like material toward cellulose is instructive. If we immerse cellulosic fabric in latex, remove it and then subject it to pressure, the latex and rubber particles are squeezed out, leaving the fabric almost free of rubber. However, if we first add some semi-coagulating material to the latex and subject the fabric to the same treatment we find that there is a decided adherence of rubber to the fabric. In fact, under normal conditions latex is incapable of being spread on cloth as its watery nature causes it to run freely away. We have found that this phenomenon of adherence to fabrics persists even in material that has been partially coagulated and violently stirred to break the gel structure. In fact, it will occur when minimum quantities of the semi-coagulant are used and before the latex has assumed its gel-like form. The nature of this adherence is still open to question.

Figure 3 is a microphotograph of latex together with some fibers of cotton. It will be seen from this that there is no real adherence to the fabric and apparently the latex and the cellulose carry the same electrical charge. Figure 4 shows the same fiber

together with latex which has been treated with a partial coagulating reagent. The groups of particles are clearly visible, but the way in which they seem to attach themselves to the fiber is very remarkable.

The importance of this type of coagulation in the industries seems to have been rather overlooked. While possibly a weaker structure is brought about by the use of such metallic salts, as was shown by Henri in his microscopic study of coagulating agents, the affinity for cellulose should more than overbalance any such defect. The ease with which such a material can be handled, spread or coated, should make it ideal in the manufacture of sheeting or in such processes where a benzol solution is laid on with a spreading knife.

We have also noted a different type of semi-coagulation which is brought about by the usual protein coagulants, such as formaldehyde and tannic acid. In this case the gelling effect is not quite as marked as it is in the case of the metallic salts, but the addition of acid will not bring about full coagulation as readily as it will in the case of the metallic salts. Extremely low pH values of cheese-like material have been noticed in latex to which tannic acid was added followed by acetic acid.

It occurred to us that the pear-shaped form of the particles of rubber in latex and the tails which they have, might give us the key to the phenomena of coagulation. With this in view we have made a microscopic study of the behavior of latex on coagulation. So far we have been unable to prove any definite connection between coagulation and the tails on the rubber particles although we still suspect the existence of such a connection and hope that it can in some way be demonstrated under the microscope. However, we have obtained a very clear view of the actual mechanism of coagulation by taking a sample of latex and adding small increments of a dilute solution of aluminum sulphate. After each addition a small portion was removed, suitably diluted, and observed under the microscope. It was found that there is a progressive tendency for the particles to form small groups. At the start these groups consist mostly of from two to ten particles, with considerable distance between the individual particles. The movements of the particles in a group with regard to each other is considerably restricted, consisting largely of the longitudinal vibration. No definite orientation of the particles could be discovered, although a grouping of two particles lengthwise to each other, one curved convex and the other concave, is very common. There are also frequent couplets where a smaller particle appears to have actually stuck by its pointed end to the side of a larger particle.

We were, however, unable to find any universal type of orientation. As more and more coagulant is added, the particles gather into ever larger groups and at the same time draw closer and closer together. As they draw together the individual particles become considerably distorted but still clearly maintain their identity. Finally the point of true coagulation is reached and the appearance here is that the particles actually burst and flux together. This phenomenon takes place with such rapidity that we have been unable to actually observe the bursting of a particle, but after true coagulation has taken place it is impossible to find any individual particles. Where the groups just described were, there will be found a homogeneous blot of rubber from which the characteristic particles mentioned above have entirely disappeared.

As further evidence, a slide was mounted with extremely dilute latex and allowed to dry. In this way, a number of the particles were kept entirely separate from other particles, and their behavior on drying was noted. It was found that on drying these particles gave every evidence of bursting. They became shapeless patches of rubber. It is possible that the coagulation of latex by grinding it in a thin film, as is done in many types of pumps, is brought about by a mechanical rupturing of the rubber particles contained in the latex.

Government Begins Rubber Investigation

Accompanied by four experts from the Department of Agriculture, the field expedition that is to investigate rubber conditions of the Amazon region in behalf of the Department of Commerce, sailed July 21 from New York direct to Pará, Brazil. The investigations will continue about eight months. The personnel of the expedition includes the following: W. L. Schurz, United States commercial attaché to Brazil, in charge, assisted by O. D. Hargis, rubber plantation expert; Dr. C. F. Marbut, chief, Division of Soils, Department of Agriculture; A. O. Pierro, and A. R. Bjorklund, of the Department of Commerce, secretarial assistants.

D. M. Figart, special agent of the Department of Commerce, who is well known in far eastern rubber circles, sailed from the United States last month on his way to southern India, Ceylon, British Malaya and the Dutch East Indies, where he will make a comprehensive study of all phases of the rubber industry. J. W. VanderLaan, of the Department of Commerce, is accompanying Mr. Figart as secretarial assistant.

On July 25 another field party in charge of J. C. Treadwell, a plantation expert, assisted by H. H. Bennett of the Bureau of Soils, Department of Agriculture, and C. R. Hill, as secretarial assistant, sailed for Panama to investigate rubber plantation possibilities in that country, Colombia, Venezuela, the Central American countries, and Mexico.

BUD GRAFTING VERSUS SEED SELECTION

A contributor to the *Bulletin de l'Association des Planteurs,* published in Antwerp, writes about his experiences in the matter of Hevea bud grafting. He found that many of the trees giving very large amounts of latex suffered from root diseases; in other words, extraordinary yields in Hevea is a sign of disease! As especially these high yielders have been resorted to for bud-wood, he questions what kind of plantations will eventually result. He pins his faith to thinning out and seed selection; high yields from budding is an illusion, he thinks.

Here it should be added that the Dutch leaders in bud-grafting advise that perfectly healthy young trees having a record of good yields for two or three years should be chosen for bud-wood, and not any tree which for a short time may give abnormally high yields.

IMPORTANCE OF BRAKE LININGS

According to carefully compiled statistics, there are more than 3,000,000 motor vehicles being operated today with defective brakes. In an effort to inform motorists of the importance of brake inspection, the National Safety Council has issued a set of safety rules for motorists who are given advice how brakes should be used, tested and adjusted.

ACCORDING TO COMMERCE REPORTS, THE EXPORTS OF CRUDE rubber from Batavia, Java, during the month of April amounted to 2,600 metric tons. The same authority makes reference to the reported heavy buying of Javanese rubber estates by certain British interests.

DURING THE CALENDAR YEAR 1922 ENGLAND LED OTHER COUNTRIES of the world in her purchases of our tire repair materials, buying goods valued at $44,248. Quebec and Ontario followed, with a total of $38,700, while other leading customers were: New Zealand, $28,360; Argentina, $21,555; Cuba, $18,384; Australia, $14,583; and British South Africa, $13,908.

REPLETE WITH INFORMATION FOR RUBBER MANUFACTURERS.—H. C. Pearson's "Crude Rubber and Compounding Ingredients."

The Manufacture of Rubber Heels

Saturation Point 350 Million Pairs Yearly—Proposition for Small Manufacturers—A 20,000-Pairs Heel Plant—Factory Operation and Costs—Finance and Sales

350 Million Pairs Yearly

THE leather shoe manufacturers and the American public have now been sold to the idea that the rubber heel is a necessity, the former on account of economy and the increased sales value of their product, the latter because of the ease and comfort it affords.

As Chester C. Burnham pointed out in THE INDIA RUBBER WORLD, November 1, 1921, once the difficulty of attaching heels to leather shoes was solved by the nailing machine, and rubber manufacturers started producing quality heels and advertising them, this branch of the rubber industry went ahead by leaps and bounds. The saturation point will not be reached until the rubber heel production reaches close to 350,000,000 pairs a year, which would mean a pair of rubber heels for every pair of shoes produced.

Opportunity for Small Manufacturers

While several of the large manufacturers of rubber goods in this country have developed their rubber heel departments to a production of 1,000,000 pairs a week, many small concerns have sprung up with rubber heels as their only product and are operating successfully with a fair margin of profit. In fact, the rubber heel business is perhaps the most attractive field for the experienced rubber man with small capital to enter at the present time.

Of course the small man cannot hope to compete with the widely advertised product of the large manufacturer, but he can readily compete for the shoe manufacturer's business for original equipment. Assuming that he is able to round up enough orders to operate on a 20,000-pairs-a-day basis, we can analyze the equipment he would need and his costs to estimate the possibilities of profitable operation.

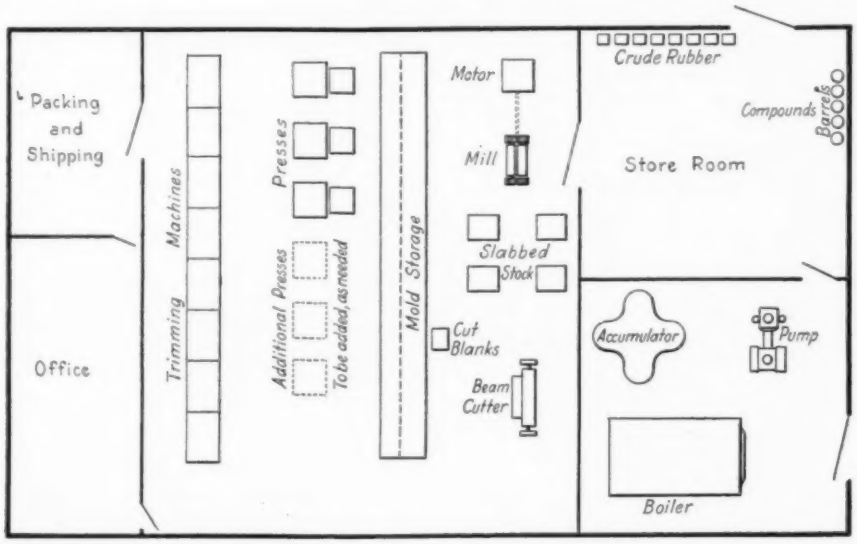
Plant for Producing 20,000 Pairs Daily

By operating on a 24-hour basis, which would be necessary to show a profit on this production, 20,000 pairs could be turned out with an initial investment of $38,800. This would consist of: Land, $2,000; building, $20,000; machinery, $16,800, comprising two 40-inch mills, four 30-inch hydraulic presses with three openings, seven trimming machines, one beam press for dieing out blanks, dies, molds, and miscellaneous equipment, including motors, boilers, etc.

Production and Labor Costs

Operating four presses in three 8-hour shifts at four heats an hour would yield 19,200 pairs of heels per day. Assuming 12,000 pairs of these to be women's heels and 7,200 to be men's, 3,400 pounds of mixed compound would be consumed per day. This figure is arrived at by computing 6 pairs per pound on women's and 3 pairs per pound on men's. While the greater part of the production would be black and tan, an average of the three prices, .114 cents per pound, will serve as an index for pricing a year's consumption of raw material, which figures (3,400 x 250 days) 850,000 pounds per year, costing $96,900 per year for raw materials.

Layout of a Typical Heel Plant



Production 20,000 Pairs of Heels Daily

Labor might be employed as follows:

	Wages Per Day
1 Man, breaking down rubber (680 lbs. used per day), grinding scrap	$4.00
1 Man, mixing (3,400 lbs. used per day, mixed in 100 lb. batches, 34 batches a day)	5.00
1 Man, slabbing out sheets on mill for cutting blanks (100 pairs per slab, 192 slabs a day)	4.00
1 Man, dieing out blanks on beam press (19,200 pairs per day)	4.00
12 Pressmen, working in eight-hour shifts, 4 heats an hour (4,800 pairs produced on each of the four presses)	60.00
7 Girls operating trimming machines to trim this production	21.00
3 Foremen, one at $8.00, to have full charge of day shift of pressmen, trimmers, mixing, sheeting, cutting; 2 night men, $6.00, to have charge of two night shifts of pressmen	20.00
3 General workmen, employed in various jobs such as weighing compounds, trucking, packing, etc.	9.00
2 Girls, inspectors of finished heels	6.00
2 Mechanical men, versed in care of hydraulic, rolling and light machinery, pipe fitting, care of motors and boilers	10.00
33 Employes	$143.00
Figured at 300 days per year	$42,900.00
In addition, allow for owner's salary and clerks	15,000.00
Total pay-roll	$57,900.00

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Miscellaneous materials used would include conical washers, cases for packing finished goods, wrapper cloths, knives, etc. For these items $25,000 a year is an estimate.

Financial and Sales Problems

Capitalization of $100,000 would be the minimum necessary to incorporate a rubber heel factory of the size described here. Whereas men's first quality heels are now selling around 11 cents a pair, and women's 5 to 6 cents, very few rubber heel factories can maintain their entire production on first quality goods. To obtain volume several grades of cheap heels selling for around 3 cents a pair on the women's and 6 cents a pair for men's must be manufactured. A fair average of all grades would be 6 cents a pair, making the total sales for a 19,200-pairs-a-day heel factory to be $288,000 a year.

Every business has to take a certain percentage of depreciation, due to seconds, goods returned because they are not up to quality, and bad accounts. The risk in the rubber heel business on seconds comes from misplaced washers, imperfect blanks, heels nicked in trimming, and sulphur bloom. In doing business direct with manufacturers the risk on bad accounts is small, but the percentage of goods returned is apt to be higher, as the leather shoe manufacturer is going to inspect his heels much more rigidly than the shoe cobbler. Figured at 6 per cent this item comes to $17,280.

Interest charges would depend on how much borrowed money was needed. The probabilities are that a small concern starting up would have to depend upon proceeds from paid-in capital to operate until the business became established. We will assume that the plant is capitalized for $100,000, $50,000 being paid in for common stock and $50,000 borrowed at 8 per cent for working capital, making the interest charges $4,000.

Taxes and insurance are figured at $10,000, and power, heat, light, and water at $12,000.

Selling expense should be comparatively low, as a manufacturer making for the leather shoe trade would have to do practically no advertising. Freight outward comes under this item, which can be conservatively figured at 10 per cent, or $28,800.

Reserve for depreciation should be figured not only on the present equipment but also on the necessity for purchasing new molds from time to time. In making for the manufacturer the brands are constantly changing, which means new bottom plates for the molds. In the larger plants these can be cut out in the machine shop but this would not be practical in the smaller factory. $10,000 a year is set aside for depreciation.

Nine Per Cent Earnings on Sales

Recapitulating the above items we have the following statement:

Total sales		$288,000
Cost of sales:		
Materials	$96,600	
Labor	57,900	
Miscellaneous material	25,000	
Depreciation	17,280	
Interest	4,000	
Taxes, insurance	10,000	
Power, heat, etc.	12,000	
Selling expense	28,800	
Plant depreciation	10,000	
Surplus	26,420	
		$288,000

This shows earnings of 9.1 per cent on sales, which demonstrates that while the rubber heel business is highly competitive the possibilities for profitable operation are there.

TRACTOR EQUIPPED WITH PNEUMATIC TIRES

During a parade recently held in Toronto, Canada, where approximately one hundred and fifty floats participated, the first prize was secured by one of these, a tractor equipped with pneumatic tires. As far as is known this is the first time, particularly in Canada, that a tractor has been run on such casings. The tires on the front were 30 by 3½ and those on the back 40 by 8 Dunlop cords.

Interesting Letters From Our Readers

Analysis of Latex Paper

TO THE EDITOR.

Dear Sir: In your issue of June 1, 1923, there is an article on the "Aging of Rubber Latex Paper," about which I beg to make some remarks.

The method of analysis adopted by the authors looks to me like one of destructive analysis as I cannot see why the extraction with acetone should be continued for 48 hours and the extraction with chloroform for another 48 hours. That is, each sample of latex paper is extracted for a total of 4 days, which seems excessive considering that the actual amount of rubber in the paper examined is so small and so widely distributed in the paper. All the time the action is prolonged the extraction liquids can immediately reach the rubber particles, which are of microscopic dimensions. If a latex paper had a rubber content of 0.5 per cent it means that 10 grams of paper would only contain 0.05 grams of rubber; that is, 1 gram of paper would contain .005 grams of rubber.

It is highly probable that this prolonged action of the acetone is sufficient to change the rubber into a soluble condition whereby it would be classed as rubber resin or as degenerated and depolymerised rubber.

The authors' conclusions that the samples, after a few days' exposure in their laboratory, contained only traces of rubber due to the oxidation of the rubber in the paper itself, is not borne out from my prolonged study and examination of latex paper. I rather think that as the paper became drier the destructive action of the acetone became more pronounced.

In nearly all cases I do not examine latex paper as to its physical qualities, such as tensile strength, folding number, resistancy, etc., until the paper is 10 or more days old and then these tests are repeated many months after and in some cases even a year or two after the paper is made.

If the qualities of rubber latex paper persist after long periods of time it cannot be true that the rubber qualities and content of the paper have disappeared by the degeneration and oxidation of the rubber.

I have had extensive experience in the analysis of native and plantation rubber, vulcanized rubber, and all kinds of rubber goods, and I have followed the general practice of expert rubber chemists who have found that an acetone extraction of 8 or 10 hours was sufficient for all practical purposes and commercial analysis. In these cases the rubber or rubber samples weighed 2 to 5 grams and were of a much more compacted structure than is the case of rubber latex paper.

When I have the opportunity I will reexamine samples of latex paper made by myself or in mills more than three years ago, both as to their chemical and physical condition.

I am now making in an experimental mill in England all kinds of boards, leather substitutes, etc., that contain 20 per cent and more of actual rubber, and my impression is that latex rubber is most closely associated with the fiber in a manner which needs to be more fully investigated.

FREDERICK KAYE.

London, England.

DIPHENYL-DIAMINO-CARBAZOLE

Diphenyl-diamino-carbazole is not harmful to health in any way, and works like zinc oxide or any other inorganic ingredient. The lead salt is now available as a vulcanization accelerator and is very acceptable because it not only has powerful curing action but is absolutely non-poisonous. It does not give off fumes nor stain or irritate the hands of the worker. It is especially recommended for mechanical goods, hard rubber, insulated wire and dark tread and tire stocks.

The Actual Temperature of Tires During Vulcanization

By D. F. Cranor[1]

IN THE cure of wrapped tread tires, heat penetration runs from outside to inside and accordingly the carcass, friction, and skim are the most rapidly vulcanizing stocks, the cushion and breaker stocks are intermediate in curing quality and the tread relatively slow curing. The core being well insulated by the carcass, it is necessary for the friction to have relatively a very fast rate of cure compared with the tread.

In the full molded type tire the flange of the core protrudes beyond the inside circumference of the mold and being in direct contact with the steam is quickly heated and provides a much improved condition for vulcanizing the carcass plies in a reasonable time.

The cord tire vulcanized by the single-cure air bag method reversed these conditions, as in this case the heat penetrates one hour at 292 degrees and fifteen minutes additional at 288 degrees average. (2) The under side of the tread, even of a small tire, shows considerable temperature lag, indicating the importance of a flat-curing stock. This portion does not reach vulcanizer temperature for thirty minutes after the end of the rise and gets forty-three minutes at 292 degrees, ten minutes at about 288 degrees and ten minutes between 270 and 285 degrees. During the first twelve minutes after the vulcanizer is up to full heat, the actual temperature of the lower tread and breaker rises slowly from 210 to 270 degrees, at which range the cure is almost negligible in the average tread stock compounded for single cure tires. (3) The carcass curing condition is relatively good, the lag being only slightly greater than in lower tread and breaker. Since the inside cools more slowly after blowing off

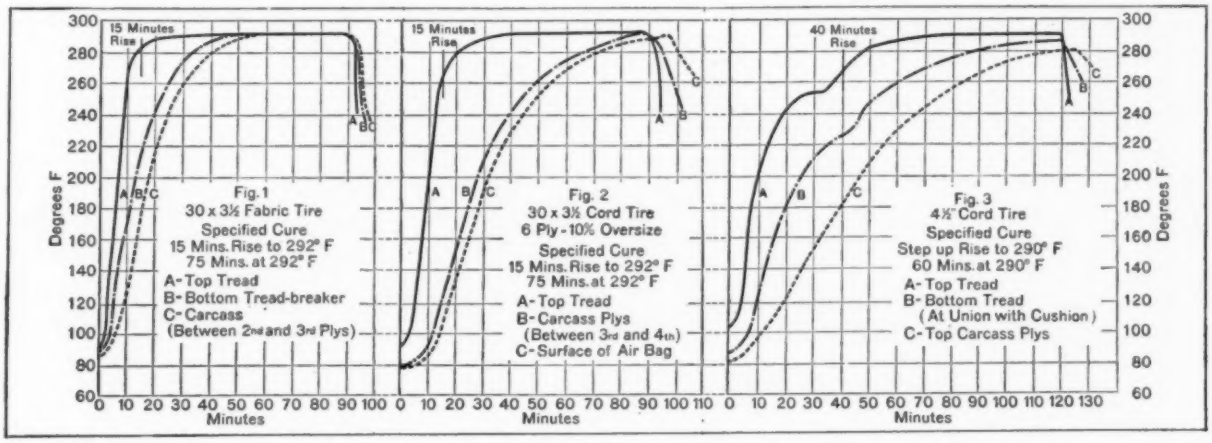


Fig. 1. Temperature Curves. Full Molded Fabric Tire. Fig. 2. Curves of 3½-Inch Cord, Single Cure Air Bag. Fig. 3. Curves of 4½-Inch Cord, Single Cure Air Bag.

from outside, and, particularly in the case of large truck tires, complicates the curing of the cord carcass plies unless the two-cure process is used.

The author has studied by means of thermo-couple method, application of which has been highly developed by P. M. Aultman, the actual temperatures of the various parts of tires during vulcanization. The results obtained were so enlightening that the work was continued to include all sizes and types of tires. Although it was obvious before taking up this work that the temperatures inside the tires were much lower than indicated by the thermometer in the vulcanizer, the magnitude of the differential was not anticipated, and in the case of the larger sizes was quite startling.

Full Molded Fabric Tire

Figure 1 shows the temperature curves A, B, C for three positions in a 30 by 3½-inch regular type and construction full molded fabric tire. The specified cure in this case is fifteen minutes' rise to 292 degrees F. and seventy-five minutes' cure at 292 degrees F. The outstanding facts in this case are: (1) The temperature lag of the top of the tread is relatively small and the curve closely follows that of the vulcanizer temperature. The tire tread attained the temperature of the heater fifteen minutes after completion of the rise and the outside of tread is heated the steam and drenching the molds, the actual curing time for the carcass is only about five minutes less than that of the lower tread and breaker. A 4-inch fabric tire shows a lag of five to ten minutes as compared with the 3½-inch.

Cord Tires—Air Bag Single Cured

Figure 2 shows curves A, B, C for three positions in a 10 per cent oversize 30 by 3½ 6-ply cord cured on air bag by the single cure process. The lag in case of a standard 4-ply 3½-inch would be somewhat less. Curve A shows that it requires twenty to twenty-five minutes to bring the top of tread fully up to the heat of the vulcanizer.

Contrasted with the full molded tire where the carcass cures for a half hour at the temperature of the heater, we find in the case of the cord, Fig. 2, curve B, shows that the entire carcass cure is simply a gradual rise, the heat of the vulcanizer being attained only at the end of the cure. The carcass remains for twenty-five minutes at a range of 240 to 280 degrees and clearly indicates the need of using a rapid accelerator capable of acting at low temperatures in cord carcass stocks. Fig. 2, curve C, shows the temperature of the surface of the air bag and in the case of the air bag cure proves that it is necessary for the heat to penetrate inwardly from the tread to the carcass. Except for slower heating, the temperature curves for the 4-inch cord are similar to the 3½-inch 6-ply tire.

[1]Technical Superintendent, Lee Tire & Rubber Co., Conshohocken, Pennsylvania.

Figure 3, A, B, C, shows the vulcanizing conditions in a 4½-inch cord cured by the single cure air bag method. The trend of the curves is similar to those for the 3½ and 4-inch cords. The notable fact is that the highest temperature reached by the lower tread, upper cushion and breaker is 4 degrees less than the outside of the tire, and that the upper carcass plies remain 10 degrees under the top of the tread. Here, the need of a low temperature accelerator is shown even more forcibly than in Fig. 2. It is to be noted that the curve C, Fig. 3, represents the seventh and eighth plies, or the upper portion of the carcass.

Although not indicated in the graph it was found that the plies nearer the air bag remain appreciably cooler throughout the entire period of vulcanization. For these reasons the use of a so-called step-up rise is advocated in vulcanizing 8-ply or larger cords cured on air by the single cure method. The lag of the carcass behind the tread is so great that the cure of the latter should be held back until the carcass acquires vulcanization temperature. This may be done by the use in the tread of an accelerator, not very active, at 240 and 250 degrees F. such as Hexa for example and a low temperature accelerator, such as ethylidene aniline, reacting energetically at about 240 degrees F. in the carcass stocks. Thus excellent balance can be obtained and vulcanization will proceed simultaneously throughout the tire.

An 8-ply 5-inch cord tire exhibits considerable temperature lag even compared with an 8-ply 4½-inch tire. The difference in the rate of heating of their treads is appreciable. This differential becomes increasingly greater farther inside, and for the lower carcass plies it is very considerable. If stocks relatively low in sulphur and having a good share of flat curing accelerator are employed, the above two sizes may probably be well cured together. This cannot be safely done, however, if the sulphur is allowed to run to high proportions.

Cord Truck Tires—Single Cured

Figure 4 shows the curve for the top of the tread and the two top plies of a 10-ply 36 by 6-inch tire. This heat was run up to full temperature through a gradual rise of forty-five minutes and then heated two hours and fifteen minutes at 292 degrees F. In spite of the forty-five minutes' rise, the tread warmed up much faster than the carcass, and was subjected to heating for 120 minutes, at 292 degrees or forty-five pounds steam pressure. The upper carcass plies, however, received only forty minutes of fast curing temperatures, namely: 270 to 285 degrees together with forty-five minutes between 240 and 270 degrees. If such a heat be adopted, the tread would have to be compounded to cure in about two hours at 292 degrees and then would be overcured on top in order to properly vulcanize the portion coming in contact with the under tread or breaker where strength of union is so vital, whereas the carcass stock would have to be capable of "setting up" in an extremely short time.

Figure 5, however, shows that by means of the step-up rise the tread can be held back to allow the lower portion of the tire a chance to catch up. In this case the time during which the top of the tread is heated is reduced by practically half so that a tread compounded for the passenger car sizes may be used, while curve C on this figure, which represents the upper carcass plies, runs very close to the temperature curve for the same part of the tire when cured with the forty-five minute rise as indicated in Figure 4.

In Figure 6 temperature curves are shown corresponding to three positions in a 40 by 8-inch truck tire. These serve to further indicate the slowness of heating up of large masses of rubber and fabric, and also show strikingly the advantages of the step-up rise in the vulcanizing of the large sizes in holding reasonably close together the temperatures of the various parts of big tires.

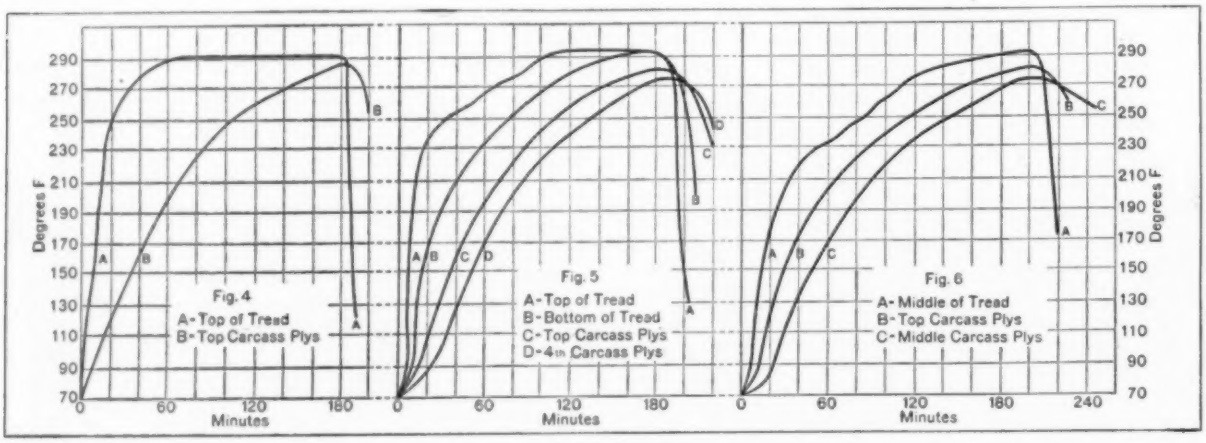


Fig. 4. Temperature Curves, 6-Inch Cord. Fig. 5. Curves of 6-Inch Cord, Step-Up Rise. Fig. 6. Curves of 8-Inch Cord, Step-Up Rise.

GROUP EXHIBITS AT COMING CHEMICAL EXPOSITION

Plans for the coming chemical exposition to be held during the week September 17 to 22 at the Grand Central Palace, New York, N. Y., show that at the exhibit this year specialized groups will form an important feature, many such group displays having been already arranged for. It has also been suggested that a "buying fair" might be practicable, and that every exhibitor should attempt to display his goods in a way that will demonstrate their particular characterictics, special uses, and selling points. The chief object, however, of the exposition as a whole is to demonstrate to the business man just what chemicals can do and are doing, and the place of chemistry in business.

SYNTHETIC PHENOLIC RESIN PRODUCTS ARE USED AS SUBSTITUTES for amber in making pipe stems and similar articles, and in the manufacture of varnishes and lacquers. They also find a large consumption in the manufacture of electric insulators. The production for 1922 by five firms was 5,944,133 pounds.

THE "EDEN DAINTYWASH," A SMALL WASHING MACHINE WEIGHing only 17½ pounds and measuring only 21½ inches overall, is manufactured by the Gillespie-Eden Corporation, Paterson, New Jersey. It is fitted with 8 feet of heavy rubber-covered cord and is operated electrically; capacity, a sheet, or 6 shirts for men.

What the Rubber Chemists Are Doing

Microscopic Examination of Rubber Compounds Containing Antimony Pigments

By A. F. Hardman[1]

THE pigment that is known to the trade as sulphuret of antimony is a mixture of widely varying composition. As used in the rubber industry it usually contains varying proportions of antimony penta- and tri-sulphides,[2] antimony oxysulphide, free sulphur and hydrated calcium sulphate. The last mentioned substance may be present in quantities up to 50 per cent or more of the total pigment, serving chiefly as a mere diluent or cheapener. As such it has practically no influence on the color of a rubber compound containing it, due to the fact that its index of refraction is practically identical with that of the rubber hydrocarbon. The size, shape and distribution of these calcium sulphate crystals in the rubber mix, however, are a matter of considerable importance, and one that has received too little notice in the past. It is of even greater importance that the active reinforcing element of this pigment, the antimony sulphide itself, shall be fine and well distributed. The distribution in particular needs to be emphasized for it has been found that antimony sulphuret, like gas black, has a tendency to form aggregations in the rubber mixture, a fault that must be controlled by proper milling. In view of these facts, a convenient method is needed for the microscopic examination of compounds containing this pigment, such as that outlined below.

A rubber compound is a very difficult subject for the microscopist, because the preparation of thin uniform sections is quite impossible without recourse to some method of hardening. This has been successfully accomplished by Depew and Ruby[3] by freezing with carbonic dioxide and liquid air, an ideal method theoretically but involving serious practical difficulties, in securing and handling the refrigerating agents. Green[4] has offered the method of hardening previous to sectioning by the use of a dilute solution of sulphur monochloride, a method which leaves little to be desired when applied to most compounds, but which has a definite limit of usefulness when applied to antimony compounds. Antimony sulphide is a relatively unstable substance and on treatment with sulphur chloride promptly reacts with it to form colorless compounds quite invisible in the rubber. An ideal section may thereby be obtained for the examination of the calcium sulphate crystals or other pigments present which are not affected by sulphur chloride.

Passing to the consideration of the antimony sulphide, it is obvious that a different method of hardening must be employed. Direct treatment with sulphur was found to be successful and may be conveniently carried out in the following manner:

A suitable quantity of sulphur is melted in a small Erlenmeyer flask and held at about 135 degrees C. A convenient method is by placing the flask of sulphur in one of the recesses in the top of an ordinary steam platen press and covering it with some heat insulating material. The rubber samples are cut rectangular about ½ by 2 cm. and two to three mm. thick from a tube or slab of vulcanized rubber. The piece is then cut with shears the long way into four or five segments which remain attached to each other at one end. The whole is then dropped into the sulphur bath where it is allowed to remain six to eight hours. The time required to attain the correct degree of hardness depends on the nature of the compound; therefore, at the end of about five hours the piece is removed and one segment broken off, the remainder being returned to the flask for another hour, etc., until the requisite degree of hardness is secured. The segments after removal and cooling are tested for hardness by cutting and flexing, the proper stage after a few trials being easily recognized. The selected segment is then cut to a thin wedge which at the point must not exceed ½ mm. in thickness, and is embedded in paraffin, sectioned and mounted. A binocular microscope with a low power objective is a great convenience in picking out and mounting the sections on the slide. Canada balsam for antimony compounds is a satisfactory mounting medium.

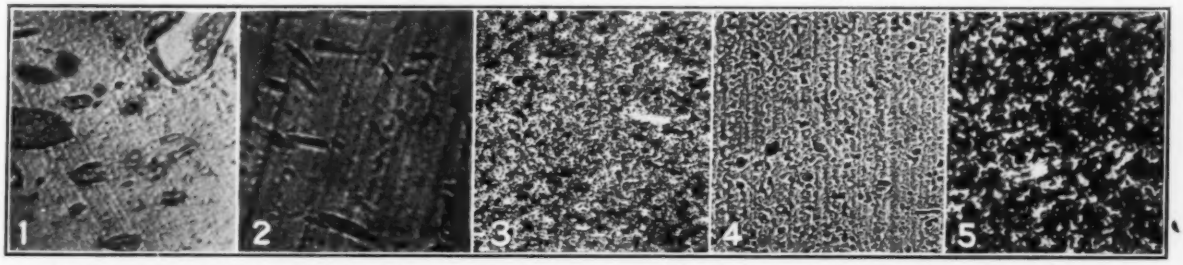


Fig. 1. Antimony Tube Sulphur Chloride Treated. Fig. 2. Antimony Tube, Different Grade of Antimony from Tube in Fig. 1. Fig. 3. Tube Containing Plastered Antimony. Fig. 4. Tube Prepared by Sulphur Chloride Method. Fig. 5. Tube Prepared by Sulphur Method.

The method described is not perfect, and chemically is open to the same objections as the sulphur chloride operation. In fact, the antimony pigments are not wholly unaffected by the prolonged treatment with sulphur, for a few small rod-shaped black crystals, probably the stable form of antimony tersulphide, are nearly always to be found in these sections. These, however, are of little consequence and may be disregarded in a study of the general dispersion of the pigment.

The advantages of microscopic study methods are illustrated in the photomicrographs. Fig. 1 is a section of an antimony tube treated by the sulphur chloride method, magnification 500 diameters. Fig. 2 is a section of another tube similar to the first in composition, but with a very different grade of antimony. The difference in the size and shape of the hydrated calcium sulphate crystals is striking. The magnification is the same as for Fig. 1. Fig. 3 is a tube containing about 20 per cent of plastered antimony. This section was hardened in the sulphur bath and shows clearly the aggregates of antimony sulphide, also many of the calcium sulphate crystals. The magnification is but 150 diameters.

[1] Research Laboratory of the Kelly-Springfield Tire Co., Cumberland, Maryland.
[2] Short, Journal Society Chemical Industry, April 29, 1922, T 109, asserts that the chief sulphur compound is the tetra sulphide.
[3] Journal of Industrial and Engineering Chemistry, 12 (1920) 1156.
[4] Journal of Industrial and Engineering Chemistry, 12 (1921) 1130.

Figs. 4 and 5 are sections of a tube, treated by the two methods respectively. This tube contains a small amount of zinc oxide and but a trace of hydrated calcium sulphate crystals which, however, are visible in both sections. The antimony sulphide (Fig. 5) is seen to be well dispersed, evidently a high grade pigment. The magnification is 500 diameters.

Technical Data on Accelerators[1]

The following organic accelerators used in American rubber manufacturing practice are briefly described and their special adaptations to rubber work indicated.

Aniline

Aniline is a colorless oily liquid turning brown on exposure to light. Its melting point is 6.24 degrees C.; boiling point, 184.4 degrees C.; specific gravity 1.027; impurities nitrobenzene and hydrogen sulphide.

Aniline is a mild accelerator, also a solvent for rubber, making it very useful in the prevention of scorching on the mill by adding from ½ to 1 per cent while finishing the batch. It is poisonous.

Ethylidene Aniline

Ethylidene aniline is a brown, viscous, resinous material of melting point about 80 degrees C. It is a very active accelerator, disperses readily, aiding the breaking down of crude rubber. It gives appreciable acceleration without zinc oxide, but is much more active with zinc oxide or the basic oxides used in rubber compounding. It reacts with sulphur at a low temperature, making it advisable to keep the mills reasonably cool while mixing and calendering. It may be used as a general accelerator in all types of compounds except where a white color must be maintained. United States patent 1,417,970.

Hexamethylene Tetramine

Hexamethylene tetramine, commonly known as "Hexa," is a white crystalline solid. It decomposes with heat and has no definite melting point. Specific gravity 1.20. It reacts with sulphur at the melting point, 115 degrees C., becoming very active at 140 degrees C. It should be finely ground to prevent spotting. It is one of the most widely used accelerators. With zinc oxide as a catalyst gives stocks of high resilience and tensile strength. It is soluble in water and may be used as a crude rubber vitalizer. United States patent 1,149,580.

Diphenylguanidine

Diphenylguanidine (D P G) is made by the reaction of aniline, carbon disulphide and ammonia in the proportions of 2, 1 and 1, with a metallic base to remove the hydrogen sulphide. It is white crystalline; melting point 144 to 147 degrees C. Impurities, thiocarbanilide, free sulphur and basic metallic sulphides. Must be ground to pass 100 mesh sieve to prevent spotting of stocks and also aid in more complete dispersion.

It may be used in pure gum stocks without a catalyst but with zinc oxide it becomes one of the most active accelerators in general use, giving stocks of high tensile strength and marked toughness. It may be used in all types of compounds, including white stocks. United States patent 1,411,231. (See page 721.)

Triphenylguanidine

Aniline-carbon disulphide and ammonia, 2:1:1, with metallic base to remove the hydrogen sulphide. White crystals, melting point 144 degrees C. Impurities same as those in diphenylguanidine. Must be ground to pass 200 mesh sieve. It is about one-fourth as active as diphenylguanidine and used where longer cure is required. Adaptable to all types of compounds, including white stocks.

Primary amines of the aromatic series react with carbon disulphide forming the corresponding thioureas, a group of accelerators especially valuable in compounded stocks where a set cure is advisable, i. e., a stiffening of the stock at a low temperature to prevent blowing.

Thiocarbanilide

Aniline-carbon disulphide 2:1. Colorless crystals, melting point 150-154 degrees C., specific gravity 1.30. Impurities, triphenylguanidine, aniline and sulphur. Must be used in compounded stocks containing zinc oxide or alkaline earth bases. Lead salts cannot be used to advantage. Thiocarbanilide is not suitable for compounds containing factice.

It is the most widely used accelerator, covering a period of more than ten years. Excepting in white stocks one of the formaldehyde aniline products of aniline oil may be used to prevent scorching while mixing. As an additional safeguard "Thio" should be incorporated during the last five minutes of mixing.

Oxidation Products of Metallic Dithiocarbamates

Zinc and other insoluble metallic salts of the dialkyated dithiocarbamic acids are oxidized, producing a desirable group or series of very active accelerators which may be used in all types of compounds. United States patent 1,436,894.

[1] E. H. Grafton, chief chemist, Quaker City Rubber Co., Philadelphia, Pennsylvania. Abstracted from "Notes on Rubber Technology," R. T. Vanderbilt Co., New York.

Reactions of Accelerators During Vulcanization[1]

V—Dithiocarbamates, Thiuram Disulphides, and the Action of Hydrogen Sulphide

By C. W. Bedford and Harold Gray[2]

Summary

Vulcanization has been the subject of careful study by the authors of the present and previous papers on the subject. The present discussion is devoted to dithiocarbamates, thiuram disulphides, and hydrogen sulphide, and their reactions during vulcanization. The conclusions reached are:

Hydrogen sulphide is formed during vulcanization by the action of sulphur on some constituent of the rubber other than the hydro-carbon, and the reaction is accelerated by heat. It decomposes metallic dithiocarbamates, and thus retards or stops curing. The metallic dithiocarbamates may be regenerated by the action of metallic oxides on free dithiocarbamic acid at ordinary temperature. Metallic oxides react with hydrogen sulphide to form sulphides and sulphhydrates, thus protecting dithiocarbamates from decomposition. The shifting of dithiocarbamic acid from one metal to another is due to the intervening action of hydrogen sulphide. Hydrogen sulphide, in the presence of metallic oxides, changes thiuram disulphides into metallic dithiocarbamates. Metallic sulphyhydrates react with phenyl mustard oil and tetramethylthiuram disulphide to form metallic dithiocarbamates.

In general, the use of a metallic dithiocarbamate with the oxide of another metal gives results comparable with the use of the dithiocarbamate of the metal of the oxide. Lead dithiocarbamates are exceptions. Lead dithiocarbamates, if "protected" by zinc oxide will accelerate vulcanization without decomposition to lead sulphide. Lead dithiocarbamates act only at relatively high temperatures. Zinc dithiocarbamates function at both high and low temperatures. They are activated by amines but retarded by hydrogen sulphide. Magnesium and calcium dithiocarbamates air-cure more rapidly than the zinc salts, but are less active at higher temperatures. Ammonia gas and other amines form addition products with zinc dithiocarbamates and accelerate curing. Ammonia gas changes thiuram disulphides to dithiocarbamates and thioureas, accelerating air-curing in the presence of zinc oxide.

No evidence has yet been presented contrary to the theory that metallic dithiocarbamates are true accelerators, activating sulphur

[1] Presented before the Division of Rubber Chemistry at the 64th Meeting of the American Chemical Society, Pittsburgh, Pa., September 4 to 8, 1922. Journal of Industrial and Engineering Chemistry, July, 1923, 720-724.

[2] The B. F. Goodrich Co., Akron, Ohio.

by the formation of polysulphides whose "super sulphur" is capable of vulcanizing at a low temperature.

Chemical Patents

The United States

CEMENT. A cement consisting of rubber digested together with commercial rosin and commercial brown shellac into a semi-solid by means of carbon disulphide and gum arabic dissolved in benzine, the digested ingredients being digested together to form a paste.—Purl C. Plasterer, Hamilton, Ohio, assignor to Darn E. Z. Laboratories, Dayton, Ohio. United States patent No. 1,458,308.

PROCESS FOR MANUFACTURE OF DISPERSOIDS. A process for the production of colloidal dispersions which consists in subjecting the substance to be dispersed and a liquid dispersion medium to intensive mechanical disintegration under the following conditions, namely: (a) employing a peripheral speed of not less than 2,000 metals per minute, (b) using a liquid which is not a good electrolite, and (c) using a mixture in which the total quantity of liquid comprises at least 70 per cent of the mixture.—Hermann Plauson, Hamburg, Germany. United States patent No. 1,458,542.

MANUFACTURE OF RUBBER. The process for the manufacture of rubber compositions which comprises the incorporation of clay in conjunction with a saponaceous material in the dry state with a rubber mixture.—William Feldenheimer, London; Walter William Plowman, East Sheen; and Phillip Schidrowitz, London, England. United States patent No. 1,458,693.

Dominion of Canada

PROCESS OF VULCANIZING RUBBER. The process of treating rubber or similar materials comprising adding thereto carbon activated by calcination at a temperature between 400 and 1200 degrees C., and vulcanizing the mixture.—The Canadian Consolidated Rubber Co., Limited, Montreal, Quebec, assignee of Reed Phillips Rose, New York, N. Y. Canadian patent No. 231,086.

GOLF BALL COMPOUND. A vulcanizable compound for golf balls, comprising materials in the following approximate proportions by weight: Rubber, 35 parts; glue, 15 parts; zinc oxide, 1 to 2 parts; asbestos, 1 to 4 parts, and sulphur, 2.8 parts.—Thomas W. Miller, Ashland, Ohio, Canadian patent No. 232,019.

VULCANIZING RUBBER. The method of vulcanizing rubber compounds which consists in incorporating with the compound a suitable proportion of sulphur, and applying to the exterior of the compound an organic accelerator, and causing the accelerator to penetrate the compound.—The Miller Rubber Co., assignee of Marion M. Harrison and Harold A. Morton, all of Akron, Ohio. Canadian patent No. 232,101.

The United Kingdom

ATTACHING RUBBER TO LEATHER. Rubber is attached to leather by vulcanizing with the aid of an accelerator or in the absence of an accelerator, the heat of vulcanization being as high as is compatible with the safety of the leather. The leather may be protected by interposing a sheet of asbestos, etc., between it and the press plate, or the rubber may be heated by high pressure steam and the leather by lower steam pressure, or not at all. The joint is improved by roughening the surface of the leather and impregnating it with rubber solution.—Fabenfabriken, Vormals F. Bayer & Co., Leverkusen, Germany. British patent No. 195,635.

METALLIZED INDIA RUBBER. A metal surface is obtained on rubber articles containing sulphur by producing a sulphide by combination of a metal with the sulphur in the rubber, and subsequently reducing this sulphide. The surface of an unvulcanized article is coated by applying foil to the surface of a mold, or metal dust to the mold or article; or the metal salt or oxide, made into a paste with a volatile medium, may be employed in the same way, and the volatile medium evaporated. The article is heated to complete the vulcanization and to convert some of the metal or salt into sulphide. Unconverted metal is stripped oft and the sulphide is reduced to the metal by an electrolytic treatment. The resulting metallic surface is burnished and may receive a further coating by electro-deposition.—A. I. G. Warren, 375 Croydon Road, Caterham Valley, Surrey, England. British patent No. 196,063.

TREATING LEATHER. Leather has applied to it a coating or thin sheet of rubber compound which is then vulcanized by the "Peachey" process. The product may be finished by the application of oils, varnishes, shellac, etc. The rubber may be in the form of latex.—A. H. Shaw, Bria Lea, Finchley Road, London, N. B. Roy and J. Atkin, Hackbridge Park, Hackbridge, Surrey. British patent No. 196,300.

SEALING METAL CONTAINERS. A composition for sealing the seams of tin or like containers, comprises a water emulsion of rubber or latex, with or without fillers; dye-stuffs and pigments; soaps, gelatines, gums, cork, paper, starches, inorganic substances, vulcanizing agents, and solvents. The added substances are preferably in the colloidal condition.—General Rubber Co., 1790 Broadway, New York, and Dewey & Almy Chemical Co., Harvey Street, North Cambridge, Massachusetts, assignees of B. Dewey, 29 Raymond Street, Cambridge, Massachusetts, and E. Hopkinson, 1790 Broadway, New York. British patent No. 196,881.

INDIA RUBBER. The vulcanization of rubber mixtures containing sulphur and a metallic oxide, such as zinc, lead, aluminum, or manganese oxide, is improved by the addition of substances which promote the dissolution of the oxide in the rubber. Suitable substances are acids whose zinc salts are soluble in hot aromatic hydrocarbons, or in terpene hydrocarbons. The action of the acids is usually enhanced by the presence of organic basic or base generating substances, such as the usual accelerators, particularly urea. The substances may be added to the rubber either on the mill with the other compounding ingredients, or during the crêping or sheeting operation, or they may be mixed with the latex before coagulation either in the free state or in the form of glycerides which are decomposed by enzymes in the latex.—W. F. Russell, Norwalk, Connecticut. British patent No. 196,924.

Germany

Patents Issued with Dates of Issue

378,003 (October 29, 1921). Method for making compounds of rubber and artificial resins. Plauson's Forschungs-institut G. m. b. H., Hamburg.

379,299 (March 20, 1919). Method for making hard-rubber-like plastic masses from cellulose derivatives. Dr. Paul Balke and Dr. Gustav Leysiefter, Troisdorf bei Köln-am-Rhein.

TUADS

Tuads is the trade designation of a patented[1] ultra-accelerator of the super-sulphur group. Chemically it is tetra-methyl-thiuram-disulphide. It is non-poisonous, odorless in finished goods, has good aging quality and will not discolor white stocks. It produces a snappy stock with high modulus stress-strain curve. Zinc oxide is required as an activator with Tuads, which is particularly adapted for inner tubes either antimony or gray, druggists' sundries, non-blooming, quick-cure molded goods and for hot-air cured goods.

[1] United States Patent No. 1,413,172.

REPLETE WITH INFORMATION FOR RUBBER MANUFACTURERS.—H. C. Pearson's "Crude Rubber and Compounding Ingredients," the rubber manufacturer's guide.

Activities of The Rubber Association of America

Memorial to Horace De Lisser

AT a meeting of the Board of Directors of The Rubber Association of America, Inc., held on Friday, June 29, 1923, the following resolution was unanimously adopted:

WHEREAS, We have learned with profound sorrow of the death of our President and beloved business associate, Mr. Horace De Lisser, Chairman of the Board of The Ajax Rubber Co., Inc., who began the Great Adventure on June 27, 1923; and

WHEREAS, Mr. De Lisser was a pioneer in the rubber and tire manufacturing industry of the United States, having, through his capability, vision and constructive effort, contributed in no small way to the successful development of that industry; and

WHEREAS, his unusually lovable personality, his kindliness, integrity and general good fellowship established him as a highly respected and outstanding character and fitted him particularly for active leadership in cooperative effort by the rubber industry through The Rubber Association of America, Inc., the responsibilities of which he admirably fulfilled; it is therefore

Resolved, That we, the members of the Board of Directors of The Rubber Association of America, Inc., for ourselves as individuals and in behalf of the membership of the association, express our deep sense of irreparable loss in the passing of Mr. De Lisser; and it is further

Resolved, That a copy of this resolution be spread upon the minutes of this board and that a copy be engrossed and forwarded to the bereaved family.

Restriction of Crude Rubber Exports

TO FIRM MEMBERS:

You will find enclosed copy of a letter, dated June 21st, addressed to Mr. H. Stuart Hotchkiss by Mr. H. Eric Miller, Director of Messrs. Harrisons & Crosfield, Ltd., and a member of the Stevenson Committee, which, it is believed, will be found of unusual interest. Mr. Miller's intimate and long standing connection with the rubber planting industry places him in a position where he can discuss this subject in a broad and intelligent manner.

It must be borne in mind that there has been little new rubber planted for the past several years and that it takes at least six years for new areas to come into bearing.

From the practical standpoint, it is of prime importance that the American rubber manufacturer consider his future supply of raw material and at a fair or reasonable price. To attain this result encouragement must be extended to the planting industry.

The Special Committee of the Rubber Association in charge of the crude rubber restriction matter has been primarily concerned with this long view of the situation and it is to be hoped that manufacturers and the public will realize that the question of present restriction sinks into insignificance as compared with the necessity of getting more acreage under rubber to provide for the future. Restriction can and will eventually be relaxed up to the point of the maximum possibilities of existing areas, but any demands in excess of this must come from new planting.

The Rubber Association of America, Inc., heartily indorses every effort to interest new capital in planting, on the sound basis that investments be made with a full knowledge of the facts so that when new plantations are established they will be permanent producers and the effort will not be wasted because of having made a non-competitive or uneconomic start.

The Special Committee will be glad to receive any questions or comments that may suggest themselves to the membership in regard to the facts and conclusions set forth herewith.

SPECIAL COMMITTEE	ALTERNATES
H. Stuart Hotchkiss (Chairman)	C. B. Seger
P. W. Litchfield	G. M. Stadelman
B. G. Work	W. O. Rutherford
A. H. Brown	J. C. Weston
W. O'Neil	W. E. Bruyn
William Pfeiffer	
H. T. Dunn	

For Committee

A. L. VILES,
General Manager.

[The letter referred to in the above bulletin is published in full on page 689 of this issue.—The Editor.]

ARGENTINA IMPORTED DURING THE FISCAL YEAR ENDING JUNE 30, 1914, American rubber tires valued at only $21,920. During the calendar year 1921 the value of such importations rose to $739,306, while in 1922 the number of tires purchased was estimated as being 94,685, with a value of $987,187.

EGYPT'S IMPORTS, DURING 1921, OF 30,503 AMERICAN AUTOMOBILE tires, valued at $70,001, more than doubled in quantity during the year following, the number being estimated as 64,207, with a value of $94,316.

Report of Inventory—Production—Domestic Shipments of Pneumatic Casings—Inner Tubes—Solid Tires, Etc.

	PNEUMATIC CASINGS				INNER TUBES				SOLID TIRES			
MONTH	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments
May, 1922	65	5,523,095	2,721,503	2,639,273	65	7,189,552	2,970,696	2,938,947	11	170,904	57,640	60,711
June, 1922	64	5,042,147	2,838,890	3,133,260	64	6,186,534	3,130,629	3,973,679	11	169,808	66,089	63,408
July, 1922	63	4,834,106	2,476,636	2,695,095	63	5,675,839	3,068,199	3,630,744	11	176,375	71,505	60,425
August, 1922	63	4,629,392	2,905,209	3,029,823	63	5,207,228	3,808,224	4,220,055	11	189,698	84,313	69,435
September, 1922	64	4,612,037	2,504,744	2,502,106	64	5,164,757	3,501,442	3,558,971	11	200,016	82,767	66,797
October, 1922	64	4,682,958	2,674,662	2,588,770	64	5,488,033	3,787,758	3,420,680	11	213,942	85,480	71,275
November, 1922	62	4,964,976	2,733,134	2,379,708	61	6,210,053	3,850,908	3,075,023	11	234,684	85,775	61,466
December, 1922	59	4,599,208	2,656,942	2,934,079	59	5,732,125	3,411,074	3,825,949	10	244,061	77,221	64,570
January, 1923	62	4,695,916	3,127,270	2,994,297	62	5,838,310	3,951,885	3,748,651	11	262,462	83,343	60,611
February, 1923	60	5,224,387	3,217,987	2,588,639	60	6,771,958	4,039,292	3,001,697	11	270,191	75,457	63,394
March, 1923	58	5,670,601	3,865,726	3,322,637	57	7,740,945	4,875,414	3,828,315	11	265,843	79,788	77,144
April, 1923	56	6,088,272	3,539,326	2,976,160	55	8,394,184	4,259,558	3,535,635	11	260,631	71,468	72,609
May, 1923	57	6,906,594	3,659,986	2,757,764	57	9,292,223	4,317,537	3,414,115	10	268,323	77,288	67,147

"Production" and "Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

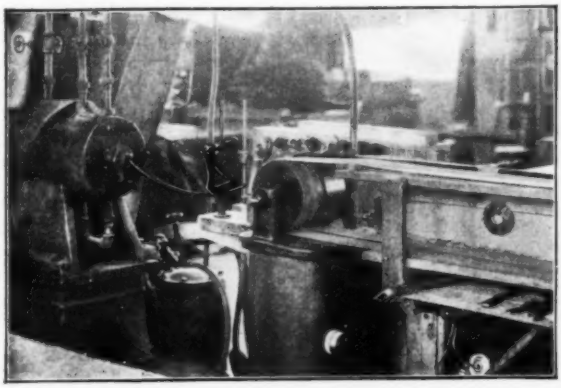
"Shipments" includes only stock forwarded to a *purchaser* and does not include stock forwarded to a warehouse branch, or on a consignment basis, or abroad.

Compiled by The Rubber Association of America, Inc.

New Machines and Appliances

Automatic Apron for Tubing Machines

A NOVEL device for the accurate control of belt conveyors used in conjunction with tubing machines is here illustrated. The principal parts are a stand, which contains the operating mechanism and control and supports one end of the conveyor belt, and a small arm bearing lightly on the material as it comes from



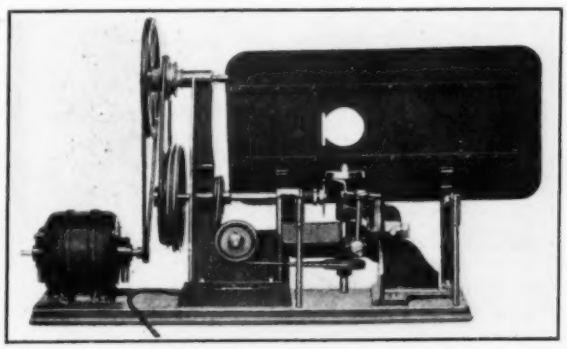
Traveling Apron for Tubers

the tubing machine, which controls the movement of the belt by a mechanism contained in the stand. This mechanism consists of a motor with electrically operated clutches which retard or accelerate the speed at which the apron belt travels, synchronizing the speed of the conveyor with the delivery speed of the tubing machine. This prevents undue tension or stretch of the uncured material and enables the operator to devote his entire attention to gaging and cutting the material to proper length.

This control is more positive than ordinary friction drive and needs no adjustment when changing from one size of tubing to another. As there are twin conveying belts, immediately upon cutting the material a new length may be started on the other belt without loss of time or material. Less labor and more accurate product are thus insured.—H. Monroe Smith, Passaic, New Jersey.

Inside Trimmer for Molded Goods

Manufacturers of molded rubber goods such as rings, gaskets and other articles that require inside trimming will appreciate



The Morris Inside Trimmer

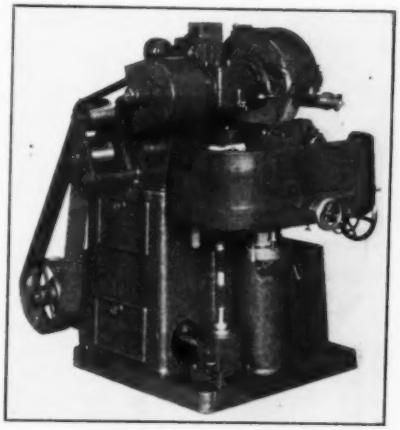
the advantages of the machine here pictured, designed for doing such trimming neatly and rapidly.

The hinged work table is raised in the illustration to show the mechanism, which comprises shafts for revolving the horizontal and vertical disk cutters or shears. These are belts driven by a motor and are adjusted by thumb screws. The incline of the work table is regulated by threaded sleeves on two upright posts.

The overflow from the trimmed goods is deflected to the rear of the machine by a cover formed over the belt which runs horizontally from the idlers to the vertical shaft pulley. A tension spring on the horizontal shaft near the vertical shearing knife with knurled screw regulates the tension as desired. The working guide under the horizontal knife prevents the goods from being damaged by the knives, and when properly set, the machine is practically fool proof.—T. W. Morris, 3304 Warren avenue, Chicago, Illinois.

Centerless Grinder for Hard Rubber

In the manufacture of hard rubber rods and tubing the cured product requires truing by grinding. The same process is desirable for sizing such hard rubber articles as fountain pens, pencils, etc. The machine here illustrated is specially designed for the centerless grinding of such hard rubber products and has been installed in a number of plants.



Detroit Hard Rubber Grinder

In operating the machine the operator feeds work to the top of the lower wheel between the two guide blades. Each piece is revolved by the lower wheel, drawn into the machine and fed automatically past the grinding wheel. Thus a continuous line of work passes through the grinder, all pieces being ground to a perfectly uniform size.

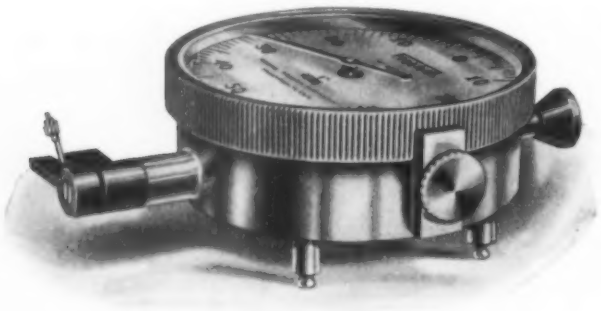
A surprising performance of the machine is its ability to grind tubing to a wall of 1/64-inch without breaking it down.—Detroit Machine Tool Co., Detroit, Michigan.

Micrometer Indicator

This is a micrometer indicator for inspecting or checking errors in dimensions of stock, for which a micrometer caliper is ordinarily used. The measuring faces can be made of any desired area or shape for use on fabrics or rubber sheet, thus making it available for use in the planning and cost department of rubber factories.

In operation the jaws are opened by pressure of the finger on the button at the top of the dial, and then allowed to close upon the work by action of the indicator spring. The direction and amount of variation from standard are shown in thousandths of an inch by the position in which the pointer comes to rest above

or below the zero line. The reading is adjusted to zero by turning the knurled bezel ring, which is then clamped against accidental movement by the small screw at the side.



Federal Micrometer Dial Gage

The diameter of the dial is 2½ inches and the regular graduation is to 0.001-inch. The instrument will gage any dimension up to 5/16-inch.—Federal Products Corporation, 15 Elbow street, Providence, Rhode Island.

Vertical Bolting Reel

A machine that will sift finely powdered materials through a fine mesh, will at the same time aërate them, will prevent separation of the lighter and heavier ingredients, and has a continuous large capacity is shown herewith.

The Rotex Sifter

This reel is a complete unit, capable of automatically feeding material into the sifter, accumulating all of the sifted material in the hopper, and discharging it into a container. The advantages are that the material is passed through the screen by the action of an air fan instead of by the ordinary method of gravity or vibration. The material is given a gyratory motion and is blown through the screen, which is stationary, around a cylindrical drum. It provides a continuous operation, which is very essential for large output.

The capacity of this machine is four or five times greater than that of the ordinary bolting reel; it occupies less floor space and is very efficient in operation. These machines are motor driven from the top and the operation is comparatively quiet.—The J. H. Day Co., Cincinnati, Ohio.

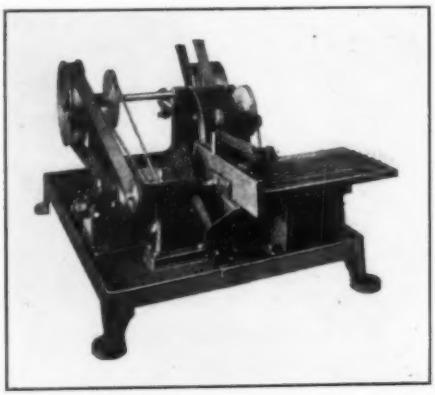
Leak Proof Joints

Victaulic leak-proof joints are unique and simple sealing devices for hydraulic, air and water mains. The annular rubber sealing ring is molded in U-form sections and held in place over the pipe-end joints by a two-part bolted collar.

The pressure of the fluid in the pipe makes the joint, and forces the sealing flanges into close contact with the pipe. The higher the pressure the tighter the joint. The pipes do not butt and there is a clearance on each side of the shoulder. The elasticity of the leak-proof ring can thus take up the expansion of the pipes.—The Victaulic Co., Limited, 28 Victoria street, London, S. W. 1., England.

Rubber Stock Cutters

A new form of rubber stock cutter is here illustrated. It is a power machine designed for bench use in cutting rubber tubing and plugs. It is indispensable where quantities of short tubes and plugs of equal lengths are required for small molded work such as eraser rubbers. The machine delivers the stock rapidly in clean cut, accurate sections. The stock bench travels back and forth by power



Don Lee Tube and Plug Cutter

and holds several strips of stock at a time for multiple cutting at each stroke.—Donnelly Machine Co., Inc., Brockton, Massachusetts.

Factory Floor Marker

In every industrial plant it is desirable to mark off spaces on the floor reserved for specific purposes as for safety zones, aisles,

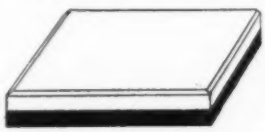
Hampden Floor Marker

storage spaces, etc. The machine here represented is for this use and makes a two- or a three-inch mark. A larger machine makes a four-inch mark.

The frame of the small machine is 10 inches by 20 inches and is made of one piece 1¼-inch angle iron. It is mounted on 5-inch malleable iron wheels with clincher grip rubber tires. The paint container has a capacity of 6 quarts and flow is controlled by hand lever. The marking pad is on the outside of the frame so that it will mark close to posts, machines or walls. It is simple to operate and will mark as fast as a man will walk.—Hampden Supply Co., 45 Sharon street, Springfield, Massachusetts.

Rubber Faced Tube Blocks

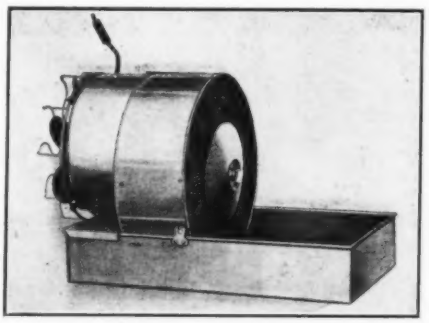
Patches on inner tubes may be firmly cured and attached with neatly beveled edges by means of rubber faced pads on blocks of wood. These are made in a series of five sizes variously adapted for close quarters around the valve stem, for moderate size punctures and for large blow-outs. The rubber next to the wood pad is cemented on and can be replaced when worn. The rubber is sufficiently thick to give perfect accommodation of the pressure on uneven surfaces and insures a neat bevel on the patch, giving secure attachment to the tubes.—Charles Meuth, 22 East North street, Danville, Illinois.



Ideal Tube Block

Automatic Humidifier

A portable humidifier is here illustrated designed for maintaining a suitable atmosphere in storage spaces in which to prepare fabrics for test purposes and to keep samples of all sorts from drying out. In factory work rooms and spreader departments it will also be valuable.



American Portable Humidifier

The apparatus comprises a water pan in which rests a cylindrical casing enclosing a wheel of thin metal vanes. At the opposite end is an electric fan which causes the vanes to revolve and dip into the water. The air current evaporates the water on the vanes, distributing moisture evenly to all parts of the room without mist or spray.

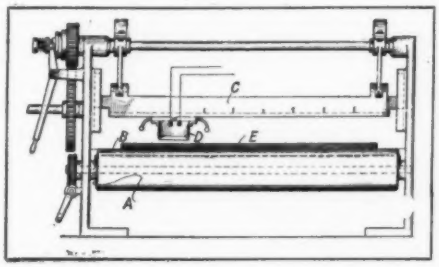
A vane wheel 4 inches wide by 16 inches diameter affords 36 square feet of moist surface for evaporation, over which 1,000 cubic feet of air per minute passes at a cost of one cent for four hours' current.—American Air Purifier Corporation, 165 East 35th street, New York, N. Y.

Machinery Patents

Machine for Cutting Sheet Rubber

In ordinary practice of cutting sheet rubber the sheets are interposed with layers of talc, starch, or similar dusting material to prevent adhesion of the cut edges.

The machine here illustrated is devised to die cut through 50 or 75 layers of sheet rubber which have no intervening layers of starch. It comprises a framework supporting a pair of horizontally parallel rolls A, which drive an endless belt B passing around the rolls and over a table between them. The table affords a backing for the die during the cutting operation as the pile of sheets is carried forward by the movement of the belt. A vertically moving cross-head C slidably supports an electrically heated cutting die D, which may be positioned at any point over the width of piled material E.



Sheet Rubber Cutter

In operation, the cutting die is heated nearly to the melting point of the rubber to be cut and under the action of the mechanism to which it is attached easily cuts, by pressure and heat, through 50 or 75 layers of sheet rubber, producing sharp, clean-cut edges without in any way matting or uniting them.—Le Roy H. Rand, assignor to Brooklyn Shield & Rubber Co., both of Brooklyn, N. Y. United States patent No. 1,449,445.

Other Machinery Patents

The United States

1,457,343 Rubber mixer. D. R. Bowen, assignor to Farrel Foundry & Machine Co.—both of Ansonia, Conn.

1,458,476 Apparatus for plying up tire fabric. J. R. Gammeter, Akron, Ohio, assignor to the B. F. Goodrich Co., New York, N. Y.

1,458,801 Bath cap reenforcing machine. J. W. Brundage, Akron, Ohio.

1,458,928 Pressure regulator and cut-off for inflating tubes. R. C. Fancher, Utica, N. Y.

The Dominion of Canada

231,087 Rubber latex sprayer. The Canadian Consolidated Rubber Co., Ltd., Montreal, Quebec, Canada, assignee of C. E. Bradley, Montclair, N. J., and J. G. Coffin, Hempstead, N. Y.

231,088 Apparatus for supplying a drying medium. The Canadian Consolidated Rubber Co., Ltd., Montreal, Quebec, Canada, assignee of C. E. Bradley, Montclair, N. J., and J. G. Coffin, Hempstead, N. Y.

232,051 Elastic braiding machine attachment. G. E. Swan, Providence, Rhode Island.

232,253 Tire making machine. The Goodyear Tire & Rubber Co., assignee of W. B. Harsel—both of Akron, Ohio.

The United Kingdom

195,690 Grinding, crushing, etc. Plauson's (Parent Co.) Ltd., 17 Waterloo Place, Pall Mall, London, England.

196,013 Tire making machine. A. E. White, 88 Chancery Lane, London, England.

196,276 Machine for making cord tires. Dickinson Cord Tire Corporation, 220 West 19th street, New York, N. Y.

196,398 Apparatus for removing tires and other rubber articles from molds. T. Sloper, Southgate, Devizes, Wiltshire, England.

Germany

Patents Issued with Dates of Issue

377,935 (July 22, 1921). Means of automatically closing punctures in tubes, hose, etc. Paul Schaurte, Königsallee, 51, Düsseldorf.

377,945 (June 19, 1920). Calender with cutting device for making strips. The Dunlop Rubber Co., Limited, London; represented by R. H. Korn, Berlin, S. W. 11.

378,185 (July 10, 1920). Vulcanizing form for treads. Ernest Hopkinson, New York; represented by R. H. Korn, Berlin, S. W. 11.

378,237 (September 7, 1921). Cord press for rubber and other plastic masses. Spencer Freeman and Richard O'Toole, Hammersmith, England; represented by Dr. D. Landenberger, Berlin, S. W. 61.

378,514 (October 20, 1922). Rubber table for cutting out shoe soles, heel patches, and the like. Karl Bayer, Herrenkellergasse 1, Ulm a. D.

378,754 (October 30, 1921). Machine for making wrapped cable rings for pneumatic tires. Secondo Riva, Turin; represented by Dr. R. Geissler, Berlin, S. W. 11.

378,761 (June 14, 1922). Self-acting apparatus for making impressions on flexible fabrics. Continental-Caoutchouc-und-Gutta-Percha-Compagnie, Hannover.

379,443 (September 21, 1921). Repair Vulcanizer. Harvey Frost & Co., Limited, London; represented by H. Licht, Berlin, S. W. 11.

379,135 (March 15, 1921). Cannula. Jean Jessé, Algiers, Algeria (Africa); represented by Dr. H. Waldeck, Berlin, W. 9.

379,433 (September 24, 1922). Uterine pessary. Dr. Erwin Dannemann, Achenbachstrasse 2, Berlin.

379,438 (August 4, 1921). Syringe for medical purposes. Dr. Apostol Wasmasof, Kustrinerstrasse 126, Berlin.

Germany

Design Patents Issued with Dates of Issue

845,485 (April 14, 1923). Repair box for tubes of pneumatic tires. Rudolf Kranich, Moosbergstrasse 40, Darmstadt.

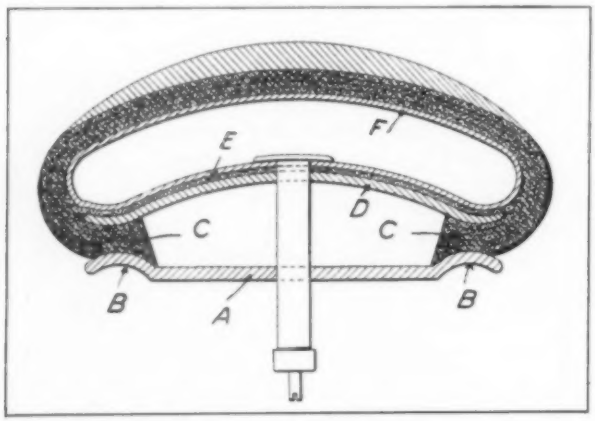
845,824 (March 31, 1923). Apparatus for cutting baby-carriage tires and the like. Hubert Bilek, Corbach in Waldeck.

846,059 (February 23, 1923). Packing for flange-pipes, and the like. Dr. Heinrich Traun & Söhne, vormals Harburger Gummi-Kamm Co., Hamburg.

Process Patents

Novel Tire and Rim

A novel type of pneumatic tire and rim is shown herewith. Owing to their construction the following advantages are secured:



The Pfeiffer Tire and Rim

(1) the casing is held on the rim automatically when inflated; (2) there can be no shifting of the beads, the result being that the cords in the casing may all run in one direction and be laid at such an angle as to give the best results under traction; (3) the tire can be provided with low side walls and wide tread surface, a comparatively small amount of air being required to inflate the tire; (4) when a blow-out occurs there will be no appreciable drop of the car.

The tire rim *A* has outwardly flaring convex edges *B*. The tire is held securely in place by the inflation pressure which compresses the tire beads *C* between the rim edges *B* and the opposing convex edges of the flexible metal ring *D*. A protecting liner *E* surrounds the metal retaining ring *D* to protect the inner tube *F*.—F. B. Pfeiffer, Akron, Ohio. United States patent No. 1,452,217.

Prolonging the Life of Air Bags

Thick walled rubber air bags used as inflatable cores for tire curing are subject to oxidation and cracking. The object of the process here described is to renew the outer surface of an oxidized air bag after it has become hardened or over-vulcanized and has begun to crack but before the main body of the bag wall has hardened too much or become deeply cracked.

The process consists in removing with a rasp the perished rubber on the surface, down to the softer underlying material, replacing it to size with unvu[illegible]ubber stock and vulcanizing the added stock. In this wa[illegible]peated renewal of the surface can be made and the life of an air bag be much prolonged.—James D. Tew, assignor to The B. F. Goodrich Co., New York, N. Y. United States patent No. 1,452,326.

Other Process Patents

The United States

1,457,781 Method of making nonexpansive hose. M. Loughead, Detroit, Mich., assignor to Four Wheel Hydraulic Brake Co., Los Angeles, Calif.

1,457,826 Making rubber shoes, boots, etc. H. C. Egerton, Ridgewood, N. J.

1,457,892 Tire fabrics. B. R. Blackwelder, LaPorte, Indiana.

1,457,986 Preparing inner tubes for vulcanization. M. A. Marquette, assignor to the Fisk Rubber Co.—both of Chicopee Falls, Mass.

1,458,732 Method of manufacturing articles comprising superposed layers of fabric. T. Sloper, Southgate, Devizes, Wiltshire, England.

1,458,776 Ball and process for manufacture. H. Nye, Akron, Ohio.

1,459,693 Method of splitting cord tires. W. M. Rand, I. C. Brook and F. C. Butler, Vancouver, British Columbia, Canada.

1,460,053 Rubber coated balloon fabric and method of manufacture. C. A. Cleghorn, Woburn Sands, England.

The Dominion of Canada

231,059 Manufacture of rubber. P. Schidrowitz, London, W. C. 2, England.

231,094 Rubber fan belt. The Durkee-Atwood Co., assignee of L. Murray—both of Minneapolis, Minn.

231,095 Rubber fan belt. The Durkee-Atwood Co., assignee of L. Murray—both of Minneapolis, Minn.

231,488 Manufacture of rubber footwear. The United Shoe Machinery Company of Canada, Ltd., Montreal, Quebec, Canada, assignee of C. H. Morrill, Swampscott, Mass.

231,714 Method of splitting cord tires. W. M. Rand, I. C. Brook and F. C. Butler—all of Vancouver, B. C., Canada.

231,878 Method of forming anchor tabs. The B. F. Goodrich Co., New York City, assignee of Frank J. MacDonald and V. H. Bodle—both of Akron, Ohio.

231,879 Method of forming straps. The B. F. Goodrich Co., New York City, assignee of F. J. MacDonald—Akron, Ohio.

232,020 Golf ball. T. W. Miller, Ashland, Ohio.

232,100 Manufacture of vulcanized rubber articles. The Miller Rubber Co., assignee of M. M. Harrison and H. A. Morton—all of Akron, Ohio.

232,227 Attaching rubber and leather heels. G. F. Quinn, Revere, Mass.

232,252 Manufacture of tires. The Fisk Rubber Co., assignee of M. A. Marquette—both of Chicopee Falls, Mass.

The United Kingdom

195,669 Making rubber toys. Plantation Rubber Manufacturing Co., Ltd., and M. M. Dessau, 14 Mincing Lane, London, England.

196,095 Kapok and rubber substitute for leather. C. R. Collyer, 423 Fulham Road, Chelsea, London, England.

196,321 Rubber articles. Plantation Rubber Manufacturing Co., Ltd., and M. M. Dessau, 14 Mincing Lane, London, England.

RUBBER GAS MAIN STOPPER

The rubber gas main bag for use in stopping the flow of gas in emergencies and for repair purposes is a rubber bladder essentially like those which are employed for inflating ordinary footballs.

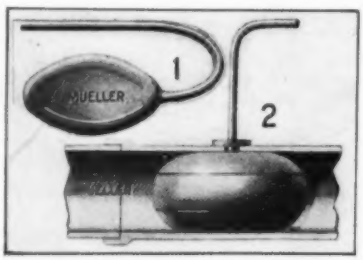


Fig. 1. Gas Main Stopper Deflated.
Fig. 2. Method of Use

It is here pictured in its deflated form and as applied inside a gas main where by inflation it forms a plug and cuts off the flow of gas. Such gas main stoppers are built in sizes from 3 to 42 inches.—H. Mueller Manufacturing Co., Decatur, Illinois.

DURING THE CALENDAR YEAR 1921 GREAT BRITAIN REEXPORTED TO the United States 459,309 centals of crude rubber, valued at £1,998,700. For the following year the figures had risen to 504,243 centals, valued at £2,021,331.

The Editor's Book Table

Book Reviews

"LES COLLOIDES DANS L'INDUSTRIE—LE CAOUTCHOUC." BY Paul Bary, engineer E. P. C. Dunod, Paris. Paper, illustrated, 6½ by 10 inches, 255 pages.

This work, which has been awarded a gold medal by the Société d'Encouragement à l'Industrie Nationale, treats primarily of rubber from its colloid point of view. Of the five chapters into which it is divided, the first covers latices, coagulation and resins. The second chapter deals with the chemical properties of rubber. The physical properties of rubber and the various mechanical tests in connection therewith are described in chapter three. Vulcanization is given the whole of the next chapter, while the final chapter is devoted to regenerated and synthetic rubbers, rubber substitutes, factices; and includes some lists of patents relating to solvents, regeneration by alkalis, and the different processes which waste rubber must undergo in the course of regeneration. A general index and another for the names of authors mentioned complete the book.

"THE TIMES OF CEYLON GREEN BOOK." PUBLISHED BY THE Times of Ceylon Company, Limited, Colombo, Ceylon. Cloth, 1390 pages, with index, 5 by 7¾ inches.

This well-known and useful publication contains, in addition to its customary features, a number of new items of interest to the rubber industry. Thirty-four sections are now included in the division devoted to the Ceylonese rubber trade, while several important tables add to the value of the publication.

"FACTS AFFECTING THE IMPORTATION OF RUBBER PRODUCTS Into China and Santo Domingo." Two separate monographs prepared by the Rubber Division, Department of Commerce, P. L. Palmerton, chief. Published by Bureau of Foreign and Domestic Commerce, Washington, D. C. Paper, 8 by 9 inches.

While the present demand in China for rubber products is of large proportions, the possibilities for still further expansion seem almost unlimited, when it is remembered that the area of Chinese territory is estimated at 4,277,000 square miles, and the population at 361,388,000 persons. The combined United States exports of rubber manufactures to this territory rose from a value of less than $25,000 in 1913 to more than $900,000 in 1920.

Statistics regarding the island of Santo Domingo include also those for the sister republic, Haiti, exports of American rubber goods to both islands greatly increasing since 1913. In the calendar year 1921, imports from the United States accounted for 87 per cent of the total value of rubber manufactures imported into the Dominican Republic, Porto Rico 6 per cent, and France 6 per cent.

"OFFICIAL AMERICAN TEXTILE DIRECTORY—1923." COMPILED annually by The Textile World. Published by Bragdon, Lord & Nagle Co., New York, N. Y. Cloth, 1092 pages, with index, 6 by 9 inches.

The 1923 edition of this well known and useful publication lists among its many departments the thousands of changes taking place in the textile industry during the last twelve months, one of the tables showing that approximately 200 new firms have begun operations during the last year. Containing about 100 more pages than the last edition, this new one is, as usual, conveniently arranged for reference and well indexed.

TREATED LINERS

The use of treated liners in calender work saves time and permits handling the material more freely as there is no necessity to avoid tacky stocks. Blue process liners are giving economical service on toe gum strips, tube wrapping tape, and between milled stock.

Recent Articles Relating to Rubber

Mechanical Problems in the Rubber Industry. Comments from well-known engineers on rubber mill machinery. On these points the author makes brief reply with data.—H. C. Young, *The Rubber Age,* London, July, 1923, 257-264.

Rubber Pigments (continuation). Discussion of production of fine particles; the various black pigments, especially gas black. D. F. Twiss, *The Rubber Age,* London, July, 1923, 281-284. Graph.

Variability of Rubber. Effect of Organic Accelerators. Review of the literature and intensive study of the variable characteristics of rubber as to time required for its cure..—G. Martin and W. S. Davey, *Journal of the Society of Chemical Industry,* March 16, 1923, 98T-106T. Graphs and tables.

The Future of the Rubber Industry. Growth of the rubber industry with the expansion of automobile output. Discussion of rubber cultivation; English control of raw rubber; economics and geography of rubber production; accessory raw materials.—William C. Geer, *Chemical Age,* June, 1923.

The Resilient Energy and Abrasion Resistance of Vulcanized Rubber. Criticism by Herman Holtz of paper by H. W. Greider[1] and reply by the author.—*Industrial and Engineering Chemistry,* July, 1923, 755-756.

Electro-Viscous Effect of Rubber-Benzene Sols. Study of the changes in viscosity of solutions of rubber in benzene brought about by additions of increasing quantities of benzoic acid, acetic acid, mercuric chloride, ammonia, hydrochloric acid, and sulphurous acid.—W. A. N. Eggink. *Recueil des Travaux Chimiques des Pays-Bas,* 1923, 42, 317-331.

The Resistance to Tearing of Rubber. Discussion of the methods developed by Tuttle, Zimmerman, and Evans for determining the resistance to tearing of rubber.—A. D. Luttringer, *Le Caoutchouc et la Gutta Percha,* 1923, 20, 11, 733-5.

Influence of Soil Upkeep on Latex and Rubber. O. de Vries. *Communications Central Rubber Station,* Buitenzorg, Java, 1922, 31, 289-95.

Latex and Rubber from Individual Trees. III. O. de Vries. *Communications Central Rubber Station,* Buitenzorg, Java, 1922, 29, 146-62.

Investigation of the Quality of Plantation Rubber Under the Ceylon Rubber Research Scheme. IV. Anonymous. *Bulletin of the Imperial Institute,* 20, 431-57 (1922).

Longitudinal Elasticity and Poisson's Ratio of India Rubber. There are two stages of stretching. Poisson's ratio for india rubber is not a constant quantity, as is generally supposed, but diminishes with increasing length of specimen. A further relation between stress and strain is necessary to satisfy the observations which it is hoped to obtain from the theory of probability.—G. B. Deohar. *Philosophical Magazine and Journal of Science,* 1923, 45, 471-9.

The Use of Rubber Products as Dielectrics. II. The classification, requirements, testing and properties of hard composite dielectrics, with special reference to materials of a rubber base.—W. S. Flight, *The India Rubber Journal,* June 16, 1923, 13-21. Diagrams and graphs.

Distillation Products of Scrap Rubber (Dutch). Reports on the investigation of samples of distillation products of scrap rubber.—*Algemeen Landbouw Weekblad voor Nederlandsch-Indie,* May 11, 1923, 2295-2302. Tables.

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[1] *Industrial and Engineering Journal,* 15 (1923), 504.

"Some Remarks on Native Rubber Gardens in Tapanoeli and Indragiri-Sumatra" (Dutch). By Dr. W. Vischer. *Archief voor de Rubbercultuur*, June, 1923. 245-250. Illustrations.

The Catalytic Decomposition of Amides (French)—I. A. Mailhe *Le Caoutchouc & la Gutta-Percha*, June 15, 1923, 11,829-11,832.

Notes on Brown Factice From the Point of View of the Determination of Its Acetonic Extraction (French).—A. R. Matthis, *Le Caoutchouc & la Gutta-Percha*, June 15, 1923, 11,833-11,834. Tables, graphs.

Investigations on the Occurrence of Caoutchouc and Latex Vessels in the Leaves of Hevea Brasiliensis (Dutch).—Dr. W. Bobilioff, *Archief voor de Rubbercultuur*, May, 1923. 205-215. Diagrams, tables.

On the Influence of Seasonal Variations in Latex and Rubber (Dutch).—O. de Vries and W. Spoon. *Archief voor de Rubbercultuur*, May, 1923. 217-238. Tables.

New Trade Publications

F. R. HENDERSON & CO., INC., CRUDE RUBBER IMPORTERS, WITH offices at 111 Broadway, New York, N. Y., have recently issued a handsome leather bound booklet containing informing charts and tabulations of statistics relating to the rubber industry. The loose-leaf binding permits the insertion of additional charts which the company proposes issuing from time to time in order to keep the publication up to date.

THE LARGE AND COMPREHENSIVE CATALOG ISSUED FOR 1923-1924 by the Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania, has, while superseding all former catalogs, several new and important features. A classified index lists apparatus of particular interest to central stations, mines, industrial plants, etc., while the whole is also indexed according to sections and special subjects. In all, 1,300 pages are devoted to descriptive matter, technical data, dimension drawings, specifications and prices, the material including all new apparatus developed in the last two years.

A VERY COMPLETE LIST OF TIRES, TUBES, AND ACCESSORIES IS appearing in the 1923 summer catalog issued by The Better Tires Co., an organization of sales agents with main offices at Michigan avenue and 18th street, Chicago, Illinois. The publication is well illustrated and indexed.

A SMALL BOOKLET ENTITLED "HOW OTHER PEOPLE GET AHEAD" has been recently prepared by the United States Treasury Department. A free copy, containing much valuable information for the small investor, will be sent to any one addressing the United States Government Saving System, Second Federal Reserve District, 97 Maiden Lane, New York, N. Y.

UNDER THE HEADING "SHIPMENTS OF SAMPLES AND ADVERTISING Matter to Foreign Countries" a series of comprehensive bulletins has been recently prepared by the Bureau of Foreign and Domestic Commerce, Washington, D. C. These bulletins are applicable to trade conditions in the following countries: The United Kingdom, Canada, Newfoundland, Australia, New Zealand, British India, Ceylon, Hongkong, Federated Malay States and Straits Settlements, British West Indies, British Honduras, British Guiana, and the Union of South Africa.

"FINE AND RESEARCH CHEMICALS, No. 44." REPRINT AND CIRcular Series of the National Research Council, Second Revision, 1923. A list of 91 American manufacturers of fine and research chemicals is given who are willing to supply these chemicals in lots of 500 grams or less, among whom are The Dow Chemical Co., National Aniline and Chemical Co., New Jersey Zinc Co., and Roessler & Hasslacher Co. The chemicals listed are in four groups as follows: Research Chemicals, Biological Stains and Indicators, Vital Stains, and Hydrogen Ion Indicators.

American Society for Testing Materials

The 26th Annual Meeting of the American Society for Testing Materials was held at Atlantic City, New Jersey, June 25-29, 1923. Reports of committees and papers of interest to rubber chemists and technologists were as follows:

Symposium on Consistency. The purpose of this symposium was primarily to secure contributions that will lead to some better understanding of that property of materials commonly designated by the term "consistency," with particular reference to the more or less conflicting usages of this term in different fields covered by the Society's activities.

The subject was introduced by a paper by F. G. Breyer and Henry Green of the Research Division of the New Jersey Zinc Co., Palmerton, Pennsylvania. The authors endeavored to show that the term "consistency" is most correctly used only when applied to materials possessing plasticity. It is proposed to define "consistency" as that property of matter by virtue of which it resists the relative motion of adjacent component parts (flow). It should not be confused with surface phenomena, such as smoothness, roughness, dryness, wetness, tackiness, nor their effect upon testing methods or machines. Recorded measurements of resistance to flow show this resistant force to be analyzable into two factors: First, that resisting the start of flow, and second, that which resists established flow at a given rate. It is proposed to call this latter force the "yield value."

The following theory is put forward, not as complete but as covering a great portion of the field: The presence of "yield value" may be attributed either to the forces of molecular orientation or to the surface tension forces existing between the several phases that constitute a mass.

The testing of metals, rubber, paint and the common so-called plastics are reviewed in the light of this theory.

Report of Committee D-11: On Rubber Products. F. M. Farmer, Chairman. Submitting specifications for wrapped cold water hose and specifications for rubber matting for use around electrical apparatus. Recommending the tentative specifications for fire hose, pump valves, and rubber gloves for electrical purposes for advancement to standard.

This report was extensively revised at the June meeting.

Apparatus and Method for Determination of Resistance to Abrasion of Rubber Compounds. W. W. Evans. Describes various types of machines for making abrasion tests on rubber compositions, and gives results on a type of machine recently developed which will permit the use of a small sample. The machine can be used by consumers of rubber goods as well as by the manufacturers in making abrasion tests.

Report of Committee D-13: On Textile Materials. A. E. Jury, Chairman. Contains proposed tentative specifications for tolerances for hose duck and belt duck, specifications for imperfections and tolerances for cord tire fabric, and tentative methods of testing cotton yarns. Revisions are proposed in the existing specifications for imperfections and tolerances for square-woven tire fabric and in certain portions of the standard general methods of testing cotton fabrics as applying to hose and belt duck and methods of making the grab test.

A Constant Load Rate Testing Machine for Textiles. G. B. Haven. Describes a machine and test in which a constant rate of load is applied to the specimen by means of a rolling weight on an inclinable plane. As the plane is inclined, the weight exerts a pull upon the specimen, which increases in constant increments of load as the angle of inclination of the plane increases. Elasticity of stretch is automatically taken up by the roll of the weight upon the plane.

Report of Committee D-9: On Electrical Insulating Materials. F. M. Farmer, Chairman. Transmitting reports on dielectric strength tests for cambric tape, sludging tests for transformer oils,

the effect of rate of raising potential in dielectric strength tests of sheet materials, and on a method of test for power factor and dielectric constant of insulating materials at commercial frequencies. Presenting as tentative method of test for voltage effects at radio frequencies and methods of testing cable splicing and pothead compounds.

Diphenylguanidine Decision Reversed

Diphenylguanidine, usually abbreviated to D. P. G. has of late become quite popular as an accelerator in the rubber industry, and various makers and sellers of this product have widely advertised their rights under patents or licenses to market D. P. G.

Readers of this journal will remember that in the issue of last February was printed an abstract of the opinion of Judge Manton which upheld the claims of Weiss patent No. 1,411,231 owned by the Dovan Chemical Co. who had sued the National Aniline & Chemical Co. for contributory infringement in that they manufactured D. P. G., solicited, and sold it to the rubber trade. The trial was held during the first week of January, the decision was quite definite in upholding the patent as a whole, and a decree for plaintiff was ordered.

The defendant, National Aniline & Chemical Co., took an appeal to the Circuit Court of Appeals for the Second Circuit and the case was reviewed before Judges Henry Wade Rogers, Charles M. Hough, and Julius M. Mayer. Decision has just been rendered by them (Judge Mayer dissenting), which reverses the first decree with costs, and the cause is remanded with directions to dismiss the bill with costs.

The First Trial

Briefly summing up the evidence at the first trial, it was shown that Twiss in England had used guanidine carbonate and amino guanidine as accelerators and published the fact in the *Journal of the Society of Chemical Industry* several years ago. A paper was read by G. D. Kratz, September, 1919, before the Rubber Section of the American Chemical Society, in which he stated the reasons why D. P. G. was a better accelerator than T. (Tri) P. G. The disclosure was made more than two years before the date of application by Weiss but publication was delayed until June, 1920, on account of the printers' strike. Kratz testified to experiments with D. P. G. in 1916 and to making a few inner tubes in 1917.

Weiss in his patent application and on the witness stand gave evidence of experiments with D. P. G. before the date of reading of the Kratz paper but not seemingly before the date Kratz testified he experimented with it and made tires.

The two decisions both depend on who first invented the use of D. P. G. Judge Manton says, "The Weiss tests in the spring of 1918 were before the reading of the Kratz paper. Kratz is said to have disclosed his idea to others in 1916." Further the judge says, "A complete and successful invention should not be voided by proof of a number of incomplete and imperfect experiments."

Appellate Judges' Decision

The appellate judges say, "What must be decided are certain questions of fact: 1. What did Weiss invent, according to his statements? 2. When did he make the invention?"

They say his claim is this: "I claim the use of D. P. G. because I was the first to observe its efficiency." This the court terms "a patent of observation." They further say: "We hold the Kratz essay to be a complete disclosure of everything in the application. Therefore Weiss is not the first, sole, true, and original inventor" as the law requires the applicant must be. Further they say: "We do not believe that anyone seriously regarded D. P. G. as a preferable accelerator before the reading of the Kratz paper, because * * * * he was the first to give comparative figures. Further, when we perceive how closely his acts in 1916 correspond with his essay of 1919 we believe his evidence, though uncorroborated * * * * and this is more than Weiss even claims to have done before the application was filed. Dr. Kratz and his associates were ahead of him at every step * * * * and * * * * they were the inventors."

Judicial Decisions

No. 45986.—Protest 959777-63724 of Ally Specialty House (Chicago)

RUBBER SYRINGES.—Syringes composed in chief value of vulcanized India rubber, and classified at 25 per cent ad valorem under paragraph 369, tariff act of 1913, are claimed dutiable at 15 per cent under paragraph 368 as manufactures of India rubber commonly known as druggists' sundries.

Opinion by MCCLELLAND, G. A. On the authority of Abstract 40301, affirmed in Knauth, Nachod & Kuhne v. United States (8 Ct. Cust. Appls. 102; T. D. 37220), the assessment of the rubber syringes in question under paragraph 369 was affirmed.—*Treasury Decisions*, Volume 43, No. 22, page 22.

No. 46151.—Protest 963667 of George J. Kelley (New York).

RUBBER BALLS—TOYS.—Small rubber balls classified as toys at 35 per cent ad valorem under paragraph 342, tariff act of 1913, are claimed dutiable as manufactures of India rubber at 10 per cent under paragraph 368.

Opinion by SULLIVAN, G. A. From the evidence it was found that these balls are used in the game of hand ball by adults. They were therefore held not to be toys, while from an examination of the samples it was found that they are composed of India rubber. Shallus v. United States (2 Ct. Cust. Appls. 456; T. D. 32205) cited. They were held dutiable at 10 per cent under paragraph 368.—*Treasury Decisions*, Volume 44, No. 2, page 15.

NATIONAL SAFETY COUNCIL INVESTIGATING SKIN RASH

Rubber manufacturers are being requested by the Health Hazards Committee of the Rubber Section of the National Safety Council, 168 N. Michigan avenue, Chicago, Illinois, to send information regarding any skin rash, appearing on the hands, arms, and faces of their employes. Replies are being treated confidentially, and it is to the interest of manufacturers to comply readily with such requests. The Health Hazards Committee is making a very earnest effort to ascertain the causes of the rash and to discover methods of prevention.

FALL MEETING OF RUBBER DIVISION

The fall meeting of the Rubber Division of the American Chemical Society will be held at Milwaukee, Wisconsin, September 10-14, 1923. Divisional and Sectional meetings will be held September 12 and 13 at the Auditorium and Hotel Pfister.

The Rubber Division requires that an abstract of approximately 100 words shall accompany the title of any paper offered for presentation before this division. Papers offered without abstracts cannot be listed on the program.

PLANS FOR M. AND A. M. A. CONVENTION

The local Boston Committee of Arrangements and the General Program Committee have been busy making plans for the fall convention of the Motor and Accessory Manufacturers Association, to be held this year at the Copley-Plaza Hotel, Boston, Massachusetts, September 19-22. F. T. Moore, district manager of The B. F. Goodrich Co., is chairman of the first-mentioned committee, while among those associated with him are T. H. Dumper and H. K. Johnson, both with the F. S. Carr Co. Maurice Switzer, vice president of the Kelly-Springfield Tire Co., is a member of the General Program Committee.

New Goods and Specialties

Surf-Board Air Mattress

THE air mattress illustrated is made of heavy rubberized tan fabric and embodies features of construction which put it into an entirely different class from the ordinary camp mattress. When fully inflated it will support four persons of ordinary weight and will not puncture unless it is actually abused, as it is built to withstand the hard usage to which it is designed to be put in its capacity as a surf-board. Each mattress is equipped with a life-line and supplied with a pump.—Hodgman Rubber Co., 25 West 43rd street, New York, N. Y.

Hodgman Aqua Air Mattress

Tire Gages as Motor Equipment

The installation of tire gages as permanent fixtures on automobiles is a long stride in advance of the old way of testing each tire with a hand gage. The Kelso gage illustrated is very attractive in appearance, being made of brass, heavily nickel plated, and entirely rust proof, dust proof and waterproof. It is easily installed, merely taking the place of the dust cap, and with a set of four it is necessary only to walk around the car and glance at each gage in order to determine whether there is enough air in the tires or too much before starting on a trip, or before leaving the car in the hands of the women folk. When heat has expanded the air the increased pressure is automatically indicated; likewise the reduced pressure from cold.—Kelso Manufacturing Co., Detroit, Michigan.

The Kelso Tire Gage

Rubber Dust Cap for Bottles

The idea of the dust cap for bottles, shown in the illustration, is to protect the mouth of the bottle from dust and thus insure against germs when the liquid is poured. The inventor's plans admit of a central opening through which the bottle stopper passes,

Rubber Dust Cap, With and Without Central Opening

or the cap may fit over stopper as well as bottle mouth. In the latter form it will serve to keep the stopper in place. It will be an inexpensive article, which druggists may easily supply with filled subscriptions and which may be handled by five and ten cent stores.—J. P. McLaurin, Dillon, South Carolina.

Knitted Elastic Necktie Band

In appearance and general use the necktie shown in the illustration does not differ from the ordinary knitted tie, but in construction an automatic change from silk or cotton threads to elastic threads is made when the band portion is being knitted. This eliminates the usual difficulties of taking up the slack by pulling the neckband under the fold of a turn-over collar and getting the knot in the correct position. The band of this tie stays where it is originally placed, the contraction of the elastic taking the knot back into position when it is tied. The inventor would be pleased to hear from manufacturers in the United States.—J. P. Hogan, 34 Regent street, Leicester, England.

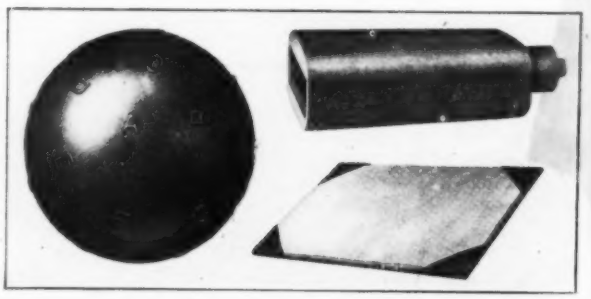
Knitted Tie with Elastic Neckband

Rubber Automobile Enamel

An enamel for recoating automobiles, which is being marketed in Los Angeles, California, contains a proportion of Pará gum and is said to give a very superior luster as well as excellent service and freedom from brush marks. The same firm also sells a rubber top dressing.—The Pearson Chemical Manufacturing Co., 123 West Washington street, Los Angeles, California.

Kindergarten Ball, Rubber Bottle Holder, and Rubber Cornered Desk Pad

Three items which seem to have "best seller" possibilities among rubber novelties are shown in the illustration. The kindergarten ball, made either solid or hollow, and with the letters of the



Three Interesting Rubber Novelties

alphabet molded in it, may be had in various colors, either plain or ornamented with flowers, animals, or other figures for educational purposes. The rubber cover for bottles, upper right corner of illustration, is designed for use in traveling, for packing medicine, toilet preparations, and similar commodities. The desk pad is provided with corners of first quality rubber, instead of the usual leather; these prevent it from slipping on the polished surface of the desk. Another feature which commends them is that they can be washed, so that when the blotter is renewed the entire pad may be freshened.—De Nevers Rubber Tyre Co., Limited, Earlesfield, London, England.

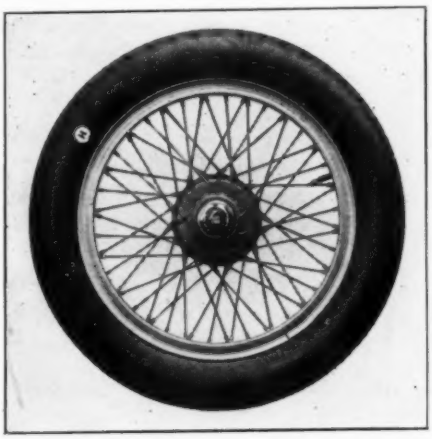
Inner Tube with Air-Gage

Every owner or driver of a motor car knows the advantage of keeping tires always at proper pressure. But taking the tire pressure frequently with a hand gage is somewhat of a nuisance, the necessity for which is obviated by the extra heavy red tube shown in the illustration. It is equipped with a combination valve and tire gage, protected by an unbreakable transparent cover through which the pressure is read at a glance.—The Paul Rubber Co., Salisbury, North Carolina.

Air-Gage Red Tube

The New Low Pressure Tire and Wire Wheel

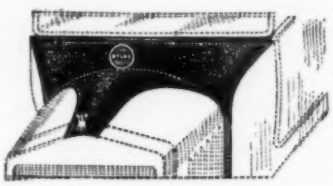
Herewith is shown the new 20-inch base wire wheel with the low pressure 28 by 4 straight-side cord tire, which is said to increase mileage 75 to 100 per cent and to reduce side sway, absorb road shocks, increase efficiency of brakes and insure riding comfort. This size tire requires only 35 to 40 pounds pressure as compared with 55 pounds in the 3½ size. The straight-side construction practically eliminates the possibility of rim cutting, bead splitting, and tube pinching. The 20-inch base wire wheel is in production by The Wire Wheel Corporation of America, Buffalo, New York. It will be used on all makes of cars, but the sections will vary, being 4, 4½, 5, 6, or 7 according to the load to be carried. The low pressure casing is being featured by the Hewitt Rubber Co., also of Buffalo, New York.



20-Inch Base Rim and "Doughnut" Tire

Rubber Cloth Rainshield for the Ford

The rainshield for Ford cars, shown in the illustration, covers the opening between the cowl dash and end of the hood and the entire hinge of the hood, extending to the water filler cap. It is fastened under the windshield and with straps to handles of the hood, and is made of rubber cloth to fit touring car, roadster, or Sedan.—Atlas Specialty Manufacturing Co., Chicago, Illinois.



Atlas "Style B" Rainshield

Automatic Windshield Cleaner

Several exclusive patented features make the windshield cleaner pictured of special interest to automobile owners and dealers. Its mechanical construction is so simple that the cost of production is small, insuring volume sales. Special adjustment is made of the squeegee against the glass so that full efficiency is attained, and when not in use it can be easily loosened and locked up out of the line of vision. Should replacement of the rubber cups on the vacuum spaces become necessary, it can be accomplished in ten or fifteen minutes at a cost of thirty cents a pair.—F. W. Stewart Manufacturing Co., Chicago, Illinois.

"Circle S" Windshield Cleaner

Rubber Device for Ear Cleansing

Manufacturers of druggists' sundries may find the novel little device illustrated here an interesting item. It is intended for massaging inside the ear and is made up, preferably, of a hard rubber hollow cylindrical handle with a soft rubber suction cup at one end to loosen wax in the ear, and at the other end a soft rubber rounded structure provided with soft rubber ribs or fins which when inserted in the ear and twisted about removes the waxy accumulation.—Frederick A. Schultz, Inventor, Hasbrouck Heights, New Jersey.

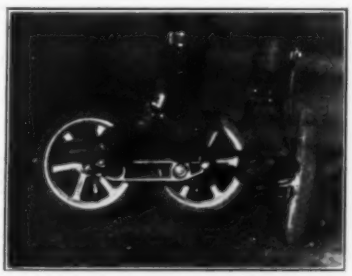
Rubber Ear Cleaner

Rubber Wrapping Bands

Wrapping bands, called "Eclipse" bands, made from selected live inner tubes of automobiles, are being marketed in one pound net weight packages and in 10 pound cartons. They are said to be economical time-savers, making it possible to tie 20 packages in as many seconds.—Industrial Products Co., 1325 Tuscarawas street, West, Canton, Ohio.

A New Rubber-Tired Cycle-Skate

The inventor of the "pedcycle" shown in the illustration claims for it that the wearer can average 18 or 20 miles an hour on them and can climb or descend any hill with ease. A brake is attached to the right foot skate which operates when the foot is pushed forward. The weight is about that of the ordinary pair of skates, notwithstanding the pneumatic cord tires with which the wheels are equipped. The advantages claimed are that the exercise is equivalent to that of skating, while the speed attained exceeds that of the bicycle; also, the skates are easily disposed of, under a desk in the office or in a corner at home, if used instead of the street car when going to and from one's work. The inventor is anxious to get in touch with a manufacturer interested in the idea.—G. H. Clark, 60 Grand street, New York, N. Y.



The "Pedcycle" Skate

Rubber Sponges Drivers' Dust Guards

Drivers or pilots in automobile races on dirt tracks now safeguard themselves from inhaling dust by tying well dampened fine rubber sponges over their mouths and noses. Such protectors were at first made with ordinary vegetable sponges, but objection was made to them as being less sanitary, less durable, and, when wet, being heavier and capable of occluding more air than rubber sponges.

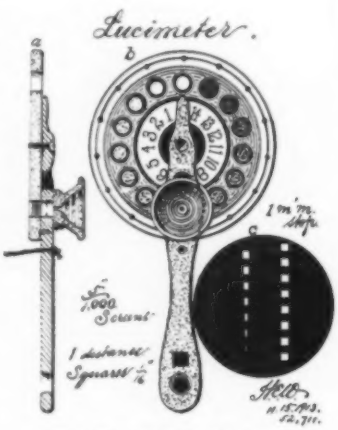
Pacific and Atlantic Photos.

Rubber Sponge Nose Guard

Such nose and mouth guards may be made in more shapely patterns and with better mode of attachment than the one here pictured.

Hard Rubber Device for Measuring Opacities

The lucimeter illustrated has been found useful in photography, in expert rifle practice, and for measuring the opacities of glass, varnish, oils, solutions, gelatins, etc. It is a little larger than an ophthalmoscope, is made of black hard rubber, and has a millimeter diaphragm. It is used to estimate the relative amount of light in a room, and in one form it assists in numerical color measurements of substances. Bacterial suspensions may be estimated quantitatively or brought to the standard opacity of a particular opening in the wheel. In the same way turbidities may be compared, and with it the measurement of total opacity as in cataracts or of nebulæ is possible, according to the inventor.—Henry Emerson Wetherill, M. D., inventor of diagnostic Instruments, R. D. 1, Phoenixville, Pennsylvania.



The Wetherill Lucimeter

Paramold Products

Paramold is a composition in which pure rubber is used as a base. It is prepared by a special process to insure uniform chemical, physical and electrical properties. Paramold has unusual heat resisting properties. Its characteristics are unimpaired by either boiling water or boiling oil. It is exceptionally well suited for the various devices used for the distribution of electrical energy at high potential. The products are formed in steel dies under heavy hydraulic pressure.

During the process of molding an insulator from paramold, metal inserts may be embedded in the material or reinforcements introduced without affecting the insulating value of the device. There is a permanent bond between the insulation and the metals and no danger of cracking due to expansion.—Hopewell Insulation & Manufacturing Co., Hopewell, Virginia.

Tonsil Remover Requires Transparent Rubber Tubing

A new operation for the surgical removal of the tonsils employs a suction tube of special design by means of which the tonsil is drawn out of its bed, while a wire-looped surgical instrument known as a tonsil snare is drawn over the base of the tonsil to complete the "shelling out" process. It is desirable that the tube be made of rubber in order to minimize the danger of breakage and yet retain a sufficient degree of transparency. The instrument is just now being put on the market and its sponsors feel that the interest already shown by throat specialists all over the country indicates a demand great enough to attract the attention of manufacturers who might be able to produce the kind of tubing necessary.—Dr. J. B. H. Waring, 109 East Main street, Blanchester, Ohio.

Suction Tonsil Remover

A Motorcycle Handlebar Grip

With the bicycle coming into its own again and the motor cycle as popular as ever, sporting goods dealers will be interested in items for the cyclists' comfort and convenience, such as the "Galirub" handshape grip illustrated. It is pneumatic and provides a cushion of air on which the palm of the hand rests, and the molded configurations conform to the shape of the fingers so that even when the grip is wet the hands will not slip. Its smooth surface will not retain grease nor does it leave a pattern imprint on the hand.—The Gallite & Rubber Mfg. Co., Limited, Galirub Mills, Burlington Road, Fulham, London, S. W. 6.

The Galirub Handshape Grip

A Trim Design for Bathing Suit Bags

The bathing suit bag illustrated is in shape and general appearance a diminutive hat box, but it is lined with rubberized sheeting and is ample in size to carry the bathing suit and all the accessories, of which the season has multiplied the number that the beach bather considers necessary. The outside of the bag is of light weight black glazette, which fastens down with snaps. The bag is also a convenience as a lunch basket, and still another use which makes it a year-round utility is as a carry-all, for the baby's things, nursing bottle, etc.—The Daisy Products, Inc., 366 Fifth avenue, New York, N. Y.

Daisy Bathing Suit Bag

News of the American Rubber Trade

Financial

New York Stock Exchange Quotations

July 24, 1923

	High	Low	Last
Ajax Rubber com.	7¼	7	7
Fisk Rubber com.	8⅛	8⅛	8⅛
Goodyear Tire & Rubber pfd.	49½	49	49
Kelly-Springfield Tire com.	34⅞	34	34
Keystone Tire & Rubber com.	5⅜	5⅛	5¼
Lee Rubber & Tire com. (2)	19	19	19
United States Rubber com.	43	42½	43½
United States Rubber 1st pfd. (8)	98¼	97¾	97¾

Akron Rubber Stock Quotations

Quotations of July 23, supplied by App-Hillman Co., Akron, Ohio, were as follows:

	Last Sale	Bid	Asked
American com.	7¾	...	10
American pfd.	50	...	40
Amazon com.	2	2	3½
Firestone com.	68¾	68	69
Firestone 6% pfd.	96	96	96⅜
Firestone 7% pfd.	85	84½	88
General com.	170	150	170
General 7% pfd.	99	...	100
Goodrich 6½'s	100	99½	100¼
Goodyear com.	11½	11¼	11⅜
Goodyear 7% preferred	49¾	48½	50½
Goodyear 1st mtg. 8's	116	115¾	116½
Goodyear deb. 8's	102⅛	102	102½
India com.	85	80	88
India 7% pfd.	90	85	90
Mason com.	2½	2	3
Mason 7% pfd.	24	23	26
Marathon	2¼	...	2
Miller com.	70	68	70
Miller pfd.	97	97	99
Mohawk com.	16	...	9
Mohawk 7% pfd.	50	49	55
Rubber Prods.	20	...	20
Seiberling com.	6	6¼	7
Seiberling 8% pfd.	65	...	54
Star com.	20	20	25
Star 8% pfd.	80	...	80

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Brunswick-Balke-Collender Co.	Com.	1¾% q.	Aug. 15	Aug. 4
Canadian Consol. Rubber Co.	Pfd.	1¾% q.	June 30	June 23
Firestone-Apsley Rubber Co.	Pfd.	3½% s.a.	July 1	June 27
Firestone Tire & Rubber Co. 6%	Pfd.	1½% q.	July 15	July 1
Firestone Tire & Rubber Co. 7%	Pfd.	1¾% q.	Aug. 15	Aug. 1
Goodrich, The B. F., Co.	Pfd.	1¾% q.	July 2	June 21
Goodyear, T. & R., Canada	Pfd.	1¾% q.	July 3	June 20
Goodyear, T. & R., Canada	Pfd.	1¾% back	July 3	June 20
Hood Rubber Co.	Pfd.	1¾% q.	Aug. 1	July 20
Kelly-Springfield Tire Co. 8%	Pfd.	$2.00 q.	Aug. 15	Aug. 1
Mason Tire & Rubber Co.	Pfd.	1¾% q. scrip	July 25	June 30
United States Rubber Co. First	Pfd.	2% q.	July 31	July 14

Mason Tire & Rubber Co.

The Mason Tire & Rubber Co., Akron, Ohio, is holding itself in a liquid cash position, and judging from its annual balance sheet is in excellent condition financially.

Current assets totaling $1,963,716 include $957,747 in cash in bank and $1,005,969 in accounts receivable and trade acceptances. Current liabilities are given at $1,272,587, including $940,049 in notes payable, $159,838 in accrued wages, interest, etc., and $172,699 reserve for Federal income taxes.

Total inventories are valued at $3,987,869. Plant and equipment are listed at $4,775,901 less a reserve of $653,463 for depreciation, with good-will and organization expenses listed at $1,243,056. Total assets are $10,115,382.

Liabilities other than current include $2,000,000 in first mortgage twenty-year 7 per cent gold sinking fund bonds, $240,747 preferred dividend warrants without maturity date; $94,597 miscellaneous reserves; $6,128,990 in 7 per cent cumulative preferred stock issued and a surplus of $377,960.

The company reports that sales for the first four months of 1923 exceeded $3,500,000.

Lee Rubber & Tire Corp.

Lee Rubber & Tire Corp., Conshohocken, Pennsylvania, for the three months ended March 31, last, made net sales of $1,715,317. Net profits after all charges and Federal taxes were $127,554, equivalent to 85 cents a share on the 150,000 shares of no par value capital stock outstanding. In the four months ended April 30, 1923, the company turned out 163,792 tires and 181,176 tubes and estimated output for the full current year is 491,000 tires and 543,000 tubes. In 1922 production was 449,429 tires and 407,569 tubes and in 1921, 378,303 tires and 342,108 tubes.

In connection with the Lee company's acquisition of the Republic Rubber Co. it is pointed out that the amount of annual output (all consisting of tires and mechanical rubber goods) of the Republic and its subsidiaries for the preceding five years and estimate for current year is as follows: 1923 (estimated), $9,500,000; 1922, $5,668,064; 1921, $3,786,904; 1920, $13,507,981; 1919, $17,948,349 and 1918, $15,961,084. The Republic plant has 26 tire building machines in operation and its capacity is about 1,200 tires a day.

Hood Rubber Co.

The balance sheet of the Hood Rubber Company, Watertown, Massachusetts, as of March 31, 1923, shows cash of $832,468; notes and accounts receivable, $5,984,449; merchandise, $5,579,020; notes payable, $500,000; accounts payable, $758,164; surplus, $1,532,532, and total assets and liabilities of $19,705,778.

New Incorporations

Achilles Rubber Corporation, June 29 (New York), 5,000 shares no par value. D. F. Rice, 1915 Beacon street, Brookline, Massachusetts; W. M. Broderick, 9 Telegraph street; R. J. Brown, 487 State street, both of Binghamton, New York. Principal office, Binghamton, New York. To manufacture automobile tires.

Admiral Tire & Rubber Co., June 13 (Ohio), $200,000. W. G. Henne, president; D. T. Henne, vice president; W. F. Henne, secretary and treasurer. Principal office, Coshocton, Ohio. To manufacture tires and tubes.

American Rubber Manufacturers, Inc., June 18 (Delaware), social, no capital. O. M. Mason, Kent, Ohio; S. G. Carkhuff; M. L. Freeman, both of Akron, Ohio. Delaware agent, Corporation Trust Company of America, Wilmington, Delaware. To maintain and conduct an association the general objects of which are to cultivate business and social relations.

Associated Tire Corporation, June 19 (New Jersey), $2,000. J. M. Saunders, 730 West 183rd street; L. J. Franzblau, 156 Manhattan avenue, both of New York City; N. Saks, 645 Hendrix street, Brooklyn, New York. Principal office, 225 Halsey street, Newark, New Jersey. To manufacture, buy, sell, import and export automobile tires and tubes.

Brunswick Tire Corporation, The, July 18 (New York), $100,000. B. E. Bensinger, 623 South Wabash avenue, Chicago, Illinois; C. P. Miller; G. E. Finch, both of 29 West 32nd street, New York City. To manufacture rubber goods.

C. W. Tire Stores, Inc., June 15 (Delaware), $50,000. E. E. Craig; M. E. Scanlon; M. F. Vance, all of Dover, Delaware. Delaware agent, United States Corporation Company, Dover, Delaware. To manufacture and deal in tires, tubes and rubber products of every class and description.

California Seamless Shoe Co., June 28 (Delaware), $200,000. H. K. and C. I. Hoch; M. E. Hothersall, all of Wilmington, Delaware. Delaware agent, Delaware Incorporating Company, Ford Building, Wilmington, Delaware. To manufacture all kinds of footwear, and articles made of skins, rubber and like materials.

Ever-Wear Tube & Rubber Corporation, June 20 (California), $500,000. L. A. Denker; J. C. Wise; J. Gritendorf. Principal office, Los Angeles, California. To deal in rubber and manufacture rubber products.

Fisk Flap Tube Rubber Co., July 14 (New Jersey), $500,000. A. F. and M. A. Wendel; G. Wiley, all of Trenton, New Jersey. Principal office, 17 East State street, Trenton, New Jersey. To manufacture automobile tires and inner tubes.

Garfield Rubber Sales Corporation, July 19 (New York), 100 shares no par value. H. Gotthelf; E. P. and A. S. Stein, all of 241 West 54th street, New York City. To deal in tires and accessories.

Hamilton Corporation, George M., June 28 (New York), $150,000. G. M. Hamilton, 4 Sheridan Square; E. C. Kerr; P. W. Quinn, both of 501 Fifth avenue, all of New York City. To manufacture textile and rubber goods.

Keystone Tire & Supply Co., June 21 (Delaware), $75,000. B. Carpenter; C. C. Krieger, both of 499 Park avenue; E. C. Measa, Cicklin Block, Pennsylvania avenue, all of Tyrone, Pennsylvania. Delaware agent, Colonial Charter Company, 927 Market street, Wilmington, Delaware. To manufacture and deal in tires and automobile accessories.

Master Tubeless Tire Corporation, June 9 (Delaware), $5,000,000. F. R. Hansell; J. V. Pimm, both of Philadelphia, Pennsylvania; E. M. MacFarland, Camden, New Jersey. Delaware agent, Corporation Guarantee and Trust Company, Fort Building, Wilmington, Delaware. To manufacture and deal in tires, rubber and rubber goods.

Montello Stay Co., Inc., May 1 (Massachusetts), $25,000. W. H. Emery, president; C. M. Counelie, vice president and treasurer; J. W. Murdock, Principal office, Brockton, Mass. To deal in all kinds and every form of thing made in whole or in part from leather or rubber or the substitute or imitation of either of them.

Phillips Rubber Co., Inc., July 10 (Massachusetts), $50,000. O. P. Hussey, president and treasurer; C. H. Baldwin; E. A. Murphy; H. J. Shaw, all of Boston, Massachusetts. Principal office, Boston, Massachusetts. To manufacture, buy, sell and deal in all kinds of molded rubber goods of both hard and soft rubber and rubber tubing and cord.

Plymouth Rand Co., Inc., May 1 (Massachusetts), $10,000. J. A. and M. A. Piercy, both of 29 School street; F. W. Piercy, 174 Washington street, all of Braintree, Massachusetts. Principal office, Braintree, Massachusetts. To deal in all kinds and every form of thing made in whole or in part from leather or rubber or the substitute or imitation of either of them.

Powertown Tire & Rubber Co., June 15 (Delaware), $5,000,000. M. W. Cole; J. L. Wolcott; A. B. Kingsbury, all of Dover, Delaware. To manufacture and deal in rubber and gutta percha and all goods of which rubber or gutta percha are component parts.

Premier Tire & Rubber Goods Co., Ltd., April 11 (Canada), $500,000. J. J. H. Taylor, president; A. F. Legge, vice president; J. C. MacNeill, secretary and treasurer. Principal office, Beansville, Ontario, Canada. To manufacture rubber goods.

Ra Clare Rubber Co., The, July 12 (Ohio), $20,000. C. H. Mansfield, president; C. J. Stegner, vice president; R. W. Breyley, secretary and treasurer. Principal office, Delaware, Ohio. To manufacture rubber toys, novelties, etc. (Formerly—Delaware Rubber Co.)

Renewed Tire Corporation, June 29 (New York), $1,000. J. G. and A. Eganhouse, both of 1 Bennett avenue; M. R. Kaplan, 1674 Broadway, all of New York City. To deal in tires.

Spartan Rubber Tire Co., The, June 12 (New Jersey), $2,000. A. Newman, president; E. D. Newman, vice president and secretary; S. Newman, treasurer; S. C. Newman, assistant treasurer. Principal office, Yardville, New Jersey. To buy, sell and export automobile tires and tubes.

Triangle Rubber & Supply Co., June 2 (Massachusetts), $50,000. A. Swerdlove, president; L. Kumins, treasurer; W. M. Silverman. Principal office, Boston, Mass. To deal in rubber goods and materials.

United Rubber Co., The, May 8 (Colorado), $50,000. C. H. Wildin; J. H. McGee; M. D. Heinemann. Principal office, Denver, Colorado. To deal in tires and automobile accessories.

Victor Electric Automatic Cloth Spreading Machine & Manufacturing Co., The, July 5 (Delaware), $1,000,000. T. L. Croteau; M. A. Bruce; F. R. Bogart, all of Wilmington, Delaware. Delaware agent, Corporation Trust Company of America, duPont Building, Wilmington, Delaware. To manufacture and deal in machinery for the cutting, sponging and preparation of cloth, canvas, rubber and paper.

Western Airless Tire Co., July 20 (Delaware), $100,000. T. L. Croteau; M. A. Bruce; A. M. Hooven, all of Wilmington, Delaware. Delaware agent, Corporation Trust Company of America, duPont Building, Wilmington, Delaware. To manufacture automobile tires.

Wood-Krewson Rubber Co., July 7 (Delaware), $25,000. J. W. Krewson, Philadelphia, Pennsylvania; P. H. Wood, Jr., Salem, New Jersey; H. Emmons, Wilmington, Delaware. Delaware agent, P. H. Wood, 700 East 10th street, Wilmington, Delaware. To manufacture and deal in all kinds of rubber and cotton goods, mill supplies, etc.

Wyatt Rubber & Chemical Co., March 22 (Maryland), 500 shares of preferred stock at $100 per share and 50.1 shares of common stock of no par value. C. M. and C. E. Wyatt; J. L. Warner, all of Baltimore, Maryland. Principal office, 4000 Gough street, Baltimore, Maryland. To deal in rubber in all of its forms.

Yatman Rubber Co., June 30 (New Jersey), $100,000. O. L. Gonzalez, president and treasurer; H. J. Yatman, vice president; F. H. Smith, secretary. Principal office, 267 Mount Pleasant avenue, Newark, New Jersey. To manufacture rubber products.

The Rubber Trade in the East and South

Manufactured Goods

The seasonal decline of manufacturing schedules in the tire industry has proved rather more severe than expected. The output of the large companies has been curtailed 20 to 50 per cent. Some smaller concerns are producing only 25 per cent of capacity.

Mechanical goods companies have experienced a slight improvement in orders in some quarters during the past two weeks.

The situation in heels and soles is rather slow on account of general strike conditions prevailing in the leather shoe trade and the holding off of leather shoe buyers for lower prices. Heels for the repair trade are about normal, at strictly competitive prices.

The carriage cloth trade is still active on old orders, very few new orders are being received.

The insulated wire mills are making a liberal output but the business is becoming competitive for the first time in twelve months. It is generally well known that the wire companies sold up their product without exertion last year.

The present has been rather a poor stason for tennis and the general outlook is reported somewhat hazy. Many manufacturers are inclined to delay orders for fall delivery of materials until dealers' requirements become more specific.

The outlook in general is encouraging. Considerable business is moving, although not in as great volume as three or four months ago. Many of the manufacturers express the belief that there will be a considerable improvement within the next couple of months.

Twenty-Fifth Anniversary of The American Hard Rubber Co.

The American Hard Rubber Co., 11 Mercer street, New York, N. Y., recently observed the twenty-fifth anniversary of the establishment of the organization. On April 26, 1898, a consolidation was effected of the interests of the following companies: The India Rubber Comb Co., College Point, Long Island, New York (established 1851); The Butler Hard Rubber Co., Butler, New Jersey (succeeding, in 1883, a former concern); and the Goodrich Hard Rubber Co., Akron, Ohio (incorporated in 1888).

In an artistically printed folder, prepared in commemoration of the event, and which is being sent to friends of the organization, reference is made not only to the loyal service during past years of executives and employes, but also to the untiring efforts of the company's president, Fritz Achelis, without whose leadership the present success of the organization might not have become possible.

New York

Under the supervision of F. G. Bean, a rubber department carrying complete stocks of standard rubber pigments has been organized by the Wishnick-Tumpeer Chemical Co., specialists in chemicals, oils and colors for the rubber trade, and with main offices in the Bush Building, 130 West 42nd street, New York, N. Y.

The Durex Chemical Corporation, manufacturer of barium products, and a subsidiary of The New Jersey Zinc Co., has removed its offices from 110 East 42nd street to 160 Front street, New York, N. Y. The following executives were also recently appointed: Edgar Palmer, president; A. P. Cobb, vice president; Albert B. Schultz, secretary; H. S. Wardner, treasurer; and E. V. Peters, general sales manager.

An agreement for the reorganization of the following companies has been recently announced: Habirshaw Electric Cable Co.; Habirshaw Electric Cable Co., Inc.; The Electric Cable Co.; and The Bare Wire Co., Inc. Copies of the plan for reorganization, with a full statement of its terms and provisions, may be obtained from the secretary of the committee, C. E. Sigler, 80 Broadway, New York, N. Y.

C. F. Beatty has been recently appointed advertising manager of The New Jersey Zinc Co., 160 Front street, New York, N. Y. Mr. Beatty assumes the position formerly held by C. A. Stedman, who will enter the eastern sales department, handling the sales of the company's products in New Jersey, Philadelphia, Baltimore, and Washington territories, and reporting to F. C. Fuller, manager of eastern sales.

Executives of the Ajax Rubber Co., Inc., 218-222 West 57th street, New York, N. Y., announce that F. M. Hoblitt has been recently appointed vice president in charge of sales.

Since the recent union of the interests of Paramount Rubber Consolidated, Inc., Little Falls, New Jersey, and the Hodgman Rubber Co., with main offices at 25 West 43rd street, New York, N. Y., the sale and merchandising of all goods manufactured by the first-mentioned organization will be handled by the Hodgman company. With the amalgamation have come better plant facilities for the manufacture of Paramount products, which will be main-

tained under the same management, patents and system as heretofore. J. A. Roberts is president of the Paramount organization, while G. B. Hodgman heads the Hodgman company.

The Allen Machine Co., Erie, Pennsylvania, announces the opening of a New York office at 165 Broadway, New York. Emanuel M. Llera will be in charge of sales for the eastern territory.

F. H. Robinson, Jr., a well-known crude rubber broker, has opened offices at 30 Church street, New York.

G. B. Horsfull has recently become connected with the New Jersey Zinc Co., 160 Front street, New York, N. Y., as a member of the sales force, and will travel in the eastern territory.

Pennsylvania

Additional machinery has been recently installed at the plant of the Vulcan Rubber Co., Erie, Pennsylvania, where operations have been going forward night and day since last November. The average daily production will now be approximately 600 tires and 1,200 tubes. Compartment battery boxes, made of a special rubber composition, represent one of this company's new products. Roscoe Gage is superintendent, Louis W. Hottel is sales manager, and Ruben Zanders is in charge of the hard rubber department.

In answer to the demand of machine men and tire finishers for a flat 20 per cent. increase in wage rates, the Pennsylvania Rubber Co., Jeannette, Pennsylvania, replied by announcing a complete shutdown of the big plant, effective July 16. Present keen competitive conditions do not permit consideration of a wage rate which would place the Jeannette plant at a disadvantage with schedules prevailing in other tire producing centers.

The Rubber Trade in New Jersey

Manufactured Goods

There is continued activity in the manufacture of rubber heels and soles and the supply is usually met with the demand. One of the largest manufacturers of heels and soles in this section reports business being about even the year round.

Following the action of the western companies the tire manufacturers of Trenton have made a reduction in the price of tires. The new price list went into effect the early part of July and is expected to result in the sale of more tires and prevent an overproduction. Tire dealers report business as being good, but as some of the Trenton plants have been operating night and day they have accumulated a large stock.

Receivership for United & Globe

Judge William N. Runyon, of the United States court of Newark, has appointed J. Philip Bird, of Jersey City, and Henry J. Haigh, of Maplewood, receivers in equity for the United & Globe Rubber Corporation, Trenton. Each was required to furnish a $50,000 bond and instructions were given them to operate the business for a period of three months; to issue $100,000 in receiver's certificates to be used in carrying on the business; and to pay back-wage claims, amounting to about $5,000, so that the concern's complement of some 250 employes may be kept intact. The receivers estimate that from $30,000 to $35,000 will be required to meet operating expenses each month. They expect to do $200,000 worth of business monthly.

In June a meeting of creditors was called, at which about $700,000 in claims was represented, and a creditors' committee was appointed. Before the refinancing plan could be put into operation a small group of note creditors started suit, which resulted in the officers and other creditors seeking protection by asking for the appointment of equity receivers.

The corporation's officers are J. Philip Bird, Jersey City, president; Foster M. Voorhees, Elizabeth, vice president; and Charles E. Swan, Trenton, secretary and treasurer.

Rubber Manufacturers' Association

The Rubber Manufacturers' Association of New Jersey held its last summer meeting the latter part of June at the Stacy-Trent Hotel, Trenton. The matter of placing a tax on rubber was freely discussed and some routine matters disposed of. The next meeting of the association will be held in September.

Trenton

The Ajax Rubber Co., in order to avoid over-production, cut down the working hours for a short time. Their July production was less than normal, but the early part of August will show a substantial increase. This is the first time in more than two years that they have been compelled to cut down production, but they expect to continue busy. The reason given by the management was that the company considered it bad policy to allow stock to accumulate.

The Thermoid Rubber Co. reports a falling off in tire production, but says it is only temporary. The company's mechanical departments are very busy, especially the brake lining department.

The Nearpara Rubber Co. reports business falling off a little during July, due to less demand for reclaimed rubber from the manufacturers. The company has experienced a very busy season and expects conditions to improve shortly.

Joseph O. Stokes, founder and president of the Joseph Stokes Rubber Co., and the Thermoid Rubber Co., of Trenton, has returned from a six months' trip that included the Americas, Japan, China, India, and the principal European countries. His many friends will be rejoiced to know that his health, which was impaired, is fully restored.

The Thac Industrial Products Corporation, Trenton, specializing in chemicals, colors, and fillers for the rubber trade, has rebuilt its plant, recently injured by fire. Samuel Haverstick is president of the organization and R. E. Carron is manager.

The Fisk Flap Tube Rubber Co., Trenton, has been incorporated with $50,000 capital for the purpose of manufacturing auto tires and inner tubes. Counselor Paul H. Wendel, of 492 West State street, Trenton, has been named as the agent in charge.

An investigation is being made of the blaze that recently destroyed the plant of the Crescent Rubber Co., Trenton. The Crescent Company met with financial difficulty some time ago and the factory has been closed for several months.

Israel Richmond, proprietor of Richmond's Tire Shop, 121 East Hanover street, Trenton, New Jersey, has been awarded the contract for furnishing the State of New Jersey with 6,000 tires for the coming year. The contract calls for Globe tires, which will be used on all the automobiles used by the state in the various institutions.

The Trent Rubber Co. reports business as being very good both at the Trenton plant and at the factory acquired some time ago at Torrence, California. The Bergougnan Rubber Co., which experienced a short dull period, is now busy again. The Spartan Rubber Co. also reports business conditions as being good.

New Jersey Notes

The Lambertville Rubber Co., Lambertville, has met with success since it created a new department for the manufacture of rubber tennis shoes. The shoes were in demand during the summer months and sales were heavy among the larger schools and colleges. The company hopes to increase this department next year. In order to determine how great a demand there is for new houses, the company is circulating a questionnaire among its employes asking if they desire to buy or rent a house and how much they are willing to pay.

Because of the extremely low water in the Delaware and Raritan Canal at Lambertville, the New Jersey Rubber Co. has been compelled to suspend operations. The plant will open again shortly, it is said.

The Splitdorf Electrical Co., Newark, makes a compound for molded insulation parts known as "Paramix," which is a hard rubber substance said to possess exceptional resistance to surface carbonization due to creepage or flash over currents. S. S. Sonneborn is manager of the molding department.

The Rubber Trade in Rhode Island

July has become, through a sort of common consent, a month of vacations throughout Rhode Island, with the plants engaged in manufacturing rubber products as well as those producing other lines. Coincidentally the month has become a period for taking inventories, and for the general overhauling and repairing of plants and machinery. This year is no exception and the end of the month finds the local rubber plants, as a rule, closed in accordance with notices that were posted by the various concerns a fortnight or more previous to the shut-down.

The Ked department, the shoe division of the National India Rubber Co., Bristol, shut down July 20 and will resume operations August 6. About 3,000 persons are affected. An inventory of manufactured goods in this division is being taken during the vacation period. The wire division, which is now furnishing employment to about 300 hands has continued in operation throughout the shut-down of the other branch of the factory.

The plant of the Lawrence Felt Co., Millville, closed July 28 until August 14 in order to allow the operatives a vacation period, during which there will be a complete overhauling of machinery and some improvements.

At the Woonsocket Rubber Co. both of its plants—the Alice Mill at Woonsocket and the Millville branch—are closed for two weeks, the last day's making having been Thursday, July 29, and the first day's resumption of operations will be Friday, August 12. The shut-down affects about 2,200 persons, of whom 1,500 are employed in the Alice Mill and 700 in the Millville plant. This is the first lengthy vacation period at the Alice and Millville plants in several years. It comes at the request of many of the operatives, and the management decided to make it a general shut-down in order that all of the workers might enjoy a vacation at the same time. During the two weeks necessary repairs to engines, boilers and other machinery are being made.

A feature of the vacation period is the holding of outings and field days of the employes of the various concerns. One of the first of these was the outing of the employes of the Davol Rubber Co., when on July 14 more than 600 employes of the firm went to Rocky Point for the sixth annual field day. The group left the Union Station at 10:30 o'clock by special trolley cars for the recreation center, where they arrived at noon. Sporting events were the first on the program, dinner being served at 2:30 o'clock, followed by a baseball game. I. B. Dunigan was chairman of the committee of arrangements and L. P. Williams, financial secretary. T. B. Dowling and Jesse Little officiated as judges and L. P. Williams was starter.

The American Wringer Company's Engineering Club, of Woonsocket, held its second annual outing at Oakland Beach on July 26, the start being made from the office of the company at 8 o'clock in the morning so that a whole day might be given up to the enjoyment of the diversified program arranged by the committee. Lunch was served at noon at the Oakland Beach Yacht Club and the afternoon was devoted to sports, including tugs of war and a baseball game. Dinner was at 6 o'clock and a musical and vaudeville entertainment with addresses was the feature of the evening. Prizes were awarded for prowess in the various sports.

A deed conveying the property of the American Wringer Co. to the American Wringer Co., Inc., has been placed on record in the office of the city clerk at Woonsocket, by which the real estate consisting of property at Social and Pond streets and land on the southerly side of Clinton street, in that city, is conveyed. The instrument is signed by the American Wringer Co., the Industrial Trust Co. as receiver, and John H. Slattery, attorney, who purchased the property at the recent public sale. The revenue stamps on the instrument indicate that the consideration was $857,000.

In connection with the sale of American Wringer Co. common stock in Woonsocket, Providence, and elsewhere, it is reported that the market for this issue is somewhere between 10 bid and 20 asked. The actual price at which sales take place is not announced. The company is now making fair progress under the new management and it is expected that earnings will show steady improvement during the coming year. The company has advanced the price of its product about 12½ per cent and on the new basis operations should be more profitable. At present it is a question of pushing sales and getting the product once more before the public to the extent that it was before the company was forced into a reorganization by financial troubles.

Business at the O'Bannon Co. plant in West Barrington is reported as improving, with favorable prospects of continued activity for some time to come. The night force, which was laid off about the middle of July, returned to work on July 23 and full time schedules are now in operation for both day and night shifts.

John N. Bill, who resigned his position as foreman of the stitching department at the factory of the National India Rubber Co. to accept a position as overseer of the stitching department of the Cambridge Rubber Co. was presented a gold watch by his friends and associates before he left Bristol.

The 10,000 feet brick extension to the weave department of the Columbia Narrow Fabric mill at Shannock, is virtually completed, the concrete floor being laid and the bases for the new looms having been set in readiness for the new machinery on its arrival from Philadelphia. Thirty new Fletcher looms are to be installed, which with the 86 now running in the old weave room will give the plant a full capacity of 116 looms. The plant is now running at full capacity 23 hours out of the 24 daily.

The General Tire Co., chartered under the laws of Rhode Island, has filed notice with the Secretary of State of an increase of capital stock from $12,000 and 680 shares of common stock without par value, to $20,000 and 800 shares of non-par common stock.

The Board of Fire Engineers of Bristol has just purchased 500 feet of new hose and 25 rubber coats from the Combination Ladder Co. of Providence and 500 feet of hose from the Eureka Hose Co., Boston.

The Rubber Trade in Massachusetts

Manufactured Goods

During July footwear business was fairly good and factories maintained the usual summer schedule. The consumption of heels has fallen off considerably in certain sections, due to labor difficulties in the Brockton shoe district. One company mentions running its plant at only one-third capacity. It is believed that the four-buckle gaiter, or overshoe, which met with such favor last winter will continue to be popular this coming winter also. The handling of such goods has proved very profitable, as this style of overshoe ordinarily costs about $5.00. During the present warm season, white shoes and sport models with crêpe rubber soles have been selling well.

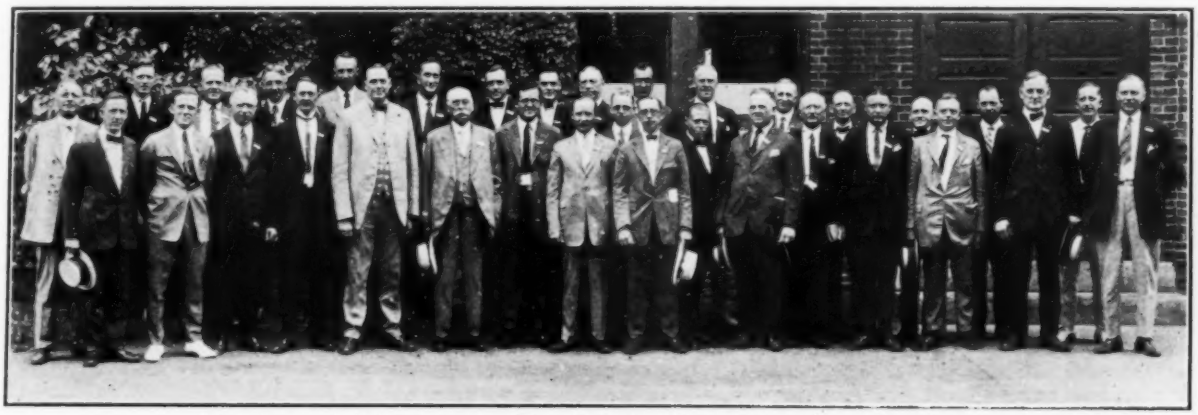
There is the usual seasonal decline in the output of mechanical rubber goods, some companies temporarily closing some of their departments. Certain other lines have, however, not been affected. Tire and tube production has also been somewhat curtailed, and the manufacture of automobile topping continues to show little falling-off. Bathing specialties and certain rubber novelties also are still in very good demand.

Firestone-Apsley Sales Conference

Salesmen from all sections of the country who represented the Firestone-Apsley Rubber Co., Hudson, Massachusetts, were present at a sales conference arranged by executives of that organization, and held at Hudson, July 18-19-20.

In the assembly room where the conference opened on Wednesday at 2 P. M. an exhibit of raw material was displayed, with various processes of manufacture also shown, the final product being a representation of every style of boot and shoe and rubber clothing that the Firestone-Apsley organization manufactures.

The opening address of welcome was made by H. G. Cressinger, manager of sales, discussions of the following subjects at the morning and afternoon sessions being then led by H. D. Cressinger, R. E. Clayton, M. P. Whipple, and C. P. Firestone, respectively: "Purchase of Raw Materials" and "Product"; "Raw Materials and Their Application in Production"; "Factory Organization and Its Relation to Production and Sales"; and "Production." In the evening the visitors attended a reception held at the home of L. D. Apsley, president of the organization.



Executives and Salesmen at the Firestone-Apsley Conference, Hudson, Massachusetts

On Thursday morning a conference with branch managers was held, H. G. Cressinger presiding. This was followed by an address by H. V. Sproat, "Waste in Industry." The afternoon addresses included: "The Business Outlook," by J. H. Mattson (Babson's Statistical Organization); "Firestone-Apsley Rubber Heels," by J. A. Sheridan; "Selling Efforts" and "Canvas Footwear, 1923-24 Season," by H. G. Cressinger. Alden Strong, C. H. Baker and L. H. Evans acted as chairmen during discussions concerning "Finances," "Credits and Collections," and "Rubber Clothing."

At the banquet held Thursday evening at Boon Lake Lodge, vice president L. A. Brown acted as toastmaster, while the chief address of the evening was made by Mr. Apsley. Before congratulating the visitors for their efforts Mr. Apsley read a telegram from Harvey S. Firestone, and also proposed a toast in honor of his associate. Other brief addresses followed.

Friday morning was devoted to conferences of branch managers with their salesmen, and to discussions led by H. G. Cressinger regarding "Selling Efforts" and "Advertising." The conference closed with an automobile trip to historical points in the immediate vicinity.

National Shoe and Leather Exposition and Style Show

Much interest was shown in the various lines of footwear displayed by rubber manufacturers at the National Shoe and Leather Exposition, held in the Merchants Building, Boston, Massachusetts, July 9 to 12. In attendance, the show was said to have exceeded all other expositions of the kind, while the actual registration of buyers was over twice that of any previous year. The South was especially well represented, while Canada sent four times as many visitors as last year.

There were, in all, 186 exhibitors, and of this number 15 were devoted wholly to rubber. At the leather and canvas footwear booths rubber was in evidence either as soles or heels, or both.

The following exhibiting rubber companies are all located in Massachusetts: Avon Sole Co., Avon, "Du-Flex" soles and heels; Bloomingdale Rubber Co., Boston, "Carlton" and "Windsor" rubber heels; Cambridge Rubber Co., Cambridge, rubber footwear, featuring "Radio" boots; The Clifford Co., Boston, "Clico" crêpe rubber soles; Dryden Rubber Co., Boston, "Dryden" rubber heels; Fellsway Rubber Co., Boston, "Travelite" rubber heels; Firestone-Apsley Rubber Co., Hudson, rubber footwear; Foster Rubber Co., Boston, "Catspaw" rubber heels; Goodyear Tire & Rubber Co., Boston, heels and soles; Alfred Hale Rubber Co., Atlantic, "Rajah" soles; Hanover Rubber Co., West Hanover, "Nu-Life," "Pli-Lite," "Cushion Tread," and "Weareze" rubber heels; Hood Rubber Products Co., Watertown, complete line of rubber and canvas footwear; O'Sullivan Rubber Co., Inc., Boston, "O'Sullivan" Safety cushion rubber heels; Panco Rubber Co., Chelsea, and Panther Rubber Co., Stoughton, "Panco" soles and "Pancord" heels; United States Rubber Co., Boston, complete line of rubber and canvas footwear, soft sole slippers and novelties, including Russian boots, Keds, "Snug-ler" felt footwear, "Springstep" heels and "Uskide" soles.

An interesting exhibit also was a representation of a modern shoe plant equipped with the United Shoe Machinery Company's machines, 100 such machines having been installed for this exposition, and each operated by an electric motor.

Boston

The Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, is making a record production in fruit jar rings, the output of "Good Luck" jar rubbers being over a million a day.

E. E. Fay, assistant general manager of the Boston Woven Hose & Rubber Co., Cambridge, Massachusetts, recently returned from a trip to Europe, where he spent several months studying trade conditions.

The Terkelsen Machine Co., 326 A street, Boston, which recently placed upon the market a new tire-wrapping machine, states that it has more orders in process than at any time during the past year.

The stock of the C. J. Bailey Co., 11-13 Avon street, Boston, Massachusetts, has been recently sold by order of the United States Court. The company was declared bankrupt a few months ago.

Joseph A. McNulty, 114 Liberty street, New York, N. Y., American representative of Leach, Neal & Co., manufacturer of iron oxide, has established a new warehouse in Boston, Massachusetts, for the convenience of the trade.

Massachusetts

The Brockton Machine Co., mold makers, in addition to their regular line of heel and mechanical goods molds are making core base molds for the rubber tiling and flooring manufacturers.

The Meade Rubber Co., Stoughton, which is just completing a new addition to the plant, reports an excellent demand for rubberized fabrics.

M. H. MacKusick, formerly managing director of the Manchester, England, factory of the Rubber Regenerating Co., returned on June 30 to this country, where he will begin operations as merchant and rubber manufacturers' agent, with offices at 611-14 Beacon Building, 6 Beacon street, Boston, Massachusetts.

The Rubber Trade in Ohio

Manufactured Goods

The usual seasonal shut-down for repairs, inventories, and hot-spell vacations, covering periods of one to two weeks, were reported in the various rubber producing centers of Ohio during the past month. Increasing orders will enable the rubber factories to operate at or near capacity in the early fall, it is predicted by many officials, who do not believe the present slow-up will be of long duration. They point to the fact that the record breaking number of motor cars in operation this year will soon use up the available stocks of tires.

While tire production in most of the rubber plants in Akron and vicinity is still running at from 25 to 30 per cent less than in the spring, sales managers report a slight increase in orders from retail dealers, the recent hot weather having given an impetus to motoring, which has reacted favorably on the tire industry. The majority of factory executives in Akron predict that price cutting is at an end. Many dealers have been afraid to place orders for tires because they feared further reductions. This situation has been largely relieved by the assurance of several companies that no further price cuts would be made.

Despite a considerable falling off in the production of tires for pleasure cars, rubber plants report little slackening in the demand for truck and bus tires. They anticipate more business in this branch of the industry on account of the increasing use of trucks and buses in transportation in America.

General Tire Prosperous

Officials of the General Tire & Rubber Co., Akron, Ohio, state that the company has just completed the most successful six months' business in its history. Gross sales for the first half of 1923 have been 75 per cent greater than for the same period last year, while a comparative estimate makes this year's business exceed $10,000,000, as compared with $7,000,000 for 1922.

The company's three new plant additions are now in full operation, with no prospect of curtailment of production. The organization which makes all sales through a chain of dealers throughout the country, and supplies no tires to car manufacturers, is at present experimenting with a new line of casings, requiring smaller wheel diameters and larger cross sections. Much testing and research are necessary, however, before such innovations can be perfected.

Since the company was formed, it has never missed payment of a single cash dividend on preferred or common stock, thus holding a unique record among tire organizations.

Goodyear Twenty-Fifth Anniversary

The Goodyear Tire & Rubber Co. will round out on August 29 the first quarter century of its existence. Elaborate plans are being made to celebrate the company's twenty-fifth anniversary on Labor Day, September 3. The celebration will begin with a parade through the city, followed by athletic events and sports at Goodyear Recreation Field. The growth of Goodyear and the development of Akron will be depicted in a series of floats. Thirty thousand persons, chiefly employes and their families and friends will take part in the demonstration. Members of the celebration committee are Robert Goodall, Fred Colley, Coach Ed Conner, Jack Kidney and B. Landerfield.

Francis A. Seiberling founded the Goodyear company August 29, 1898. He started with a capital of $3,600, and began the manufacture of rubber tires in a small one-story factory, formerly used by a straw board company in East Akron. Only about 25 workmen were employed in the new plant when it began operations.

P. W. Litchfield, at present first vice president and factory manager of the company, joined Mr. Seiberling in the business in 1901. Two years later George M. Stadelman, who is now president of Goodyear, became connected with the company.

After the Goodyear reorganization in 1920, Mr. Seiberling resigned as president of the company and shortly thereafter founded the Seiberling Tire & Rubber Co., in Barberton. E. G. Wilmer, of New York, served as president of the company until the early part of this year, when he was succeeded by Mr. Stadelman, then vice president. Mr. Wilmer is now chairman of the Board of Directors, with headquarters in New York City.

New Goodrich Airplane Tire

The B. F. Goodrich Rubber Co. has just announced the development of a new skirted airplane tire with windshield disk attachment which is a signal advancement in airplane tire designing. The skirt of this new tire is a loose, rubber covered fabric flap, vulcanized to the side walls of the tire. By bringing the shield out to the sidewall of the tire and making it even with the tire at its widest part, the Goodrich airplane tire overcomes the "pocketing" tendency of other styles where the shield is hooked over the rim.

Increasing Interest in Large Section Tire

Akron manufacturers, particularly the Firestone Tire & Rubber Co. and The B. F. Goodrich Co. report an increasing interest among consumers and the trade in the new large air section tire. J. E. Hale, Firestone development engineer, points out that an important factor in the development is tire durability, which must not be impaired by necessary changes to obtain low pressure and greater area.

In a statement to dealers the Goodrich company has sounded a warning, however, that the low pressure tire is still in the experimental stage, and no one can accurately predict what will be its future. Dealers and the public are urged to go slow before jumping at the conclusion that the rubber industry is on the verge of being revolutionized with the advent of the "balloon" tire.

Akron

John Hadfield, president of the Lincoln Rubber Co., Barberton, announced that a $32,000 mortgage on the plant of the company has just been cancelled. Earnings have steadily increased during the past few months, and the force of workers has been enlarged. The company makes a specialty of the manufacture of gloves for surgeons and household use. An increasing demand is reported for the "Knuckle-fit" glove, a patented product of the company.

The Akron plant of the Kelly-Springfield Tire & Rubber Co. has shut down for an indefinite period. It is generally understood that the local branch will be disposed of and production centralized at the main factory in Cumberland, Maryland. Several thousand men were employed here by the company until a short time ago. Officials of the Goodyear Tire & Rubber Co. and the General Rubber Co. denied reports that they were contemplating the purchase of the plant.

After being shut down in most departments for several weeks, the Mason Tire & Rubber Co. at Kent is operating again at about 50 per cent normal capacity, as reported by D. M. Mason, general manager of the plant. The 500 men who were recently laid off are being gradually taken back. Mr. Mason denied rumors

that the company was contemplating a shut-down for an indefinite period. On the contrary, he said, business was increasing, and most of the surplus stock in the company's warehouses had been sold. He expects the business to continue to improve.

The Akron Standard Mold Co., Akron, Ohio, maker of rubber machinery, has recently sent to its patrons and friends attractive cigarette cases, which have certain novel and handy features.

The Acushnet Process Co., New Bedford, Massachusetts, specializing in refined rubbers, has recently appointed John A. Lyon as the company's western representative, with headquarters at Akron, Ohio. P. E. Young is president of the Acushnet organization.

Odd and obsolete sizes of both clincher, Q. D. clincher, and straight side tires are still being manufactured by The Mohawk Rubber Co., Akron, Ohio, the organization finding the demand for such tires of considerable importance, particularly since other companies have discontinued their manufacture. H. B. Hankinson has recently accepted the position of assistant sales manager for the Mohawk organization.

The plant of the Lambert Tire & Rubber Co., Akron, Ohio, has been recently enlarged, and equipment valued at about $75,000, has also been installed. Executives of the organization report that business during the first six months of the present year is double that of a year ago, while sales in foreign countries of the company's "Trublpruf" cord tires represent a steady increase. G. M. Collette is general manager of the Lambert organization.

H. E. Taylor, formerly sales manager of the Las-Stick Patch Co., has been recently appointed director of sales for The Farran-oid Co., Akron, Ohio, manufacturers of fan belts.

W. O'Neil, vice president and general manager of The General Tire & Rubber Co., Akron, Ohio, has recently sent an open letter to the 132,000 tire and automotive merchants of the United States, in which he disclaims the right of tire manufacturers to "juggle" with tire prices. According to Mr. O'Neil, the recent reductions in the prices of casings and tubes are affecting tire dealers most unfavorably, while the present unsettling prices are making buyers hesitate. Anything that means disaster for the tire dealer will, he says, ultimately have a corresponding effect upon the tire manufacturer also.

Ohio Notes

The Dayton Rubber Manufacturing Co. of Delaware, with factories and general offices at Dayton, Ohio, has recently appointed Clarence W. Hamilton as its manager of advertising, publicity and sales promotion. The company manufactures "Thorobred" cord and fabric tires, tire accessories and repair materials.

Having purchased a two-story and basement factory at Coshocton, Ohio, The Admiral Tire & Rubber Co., recently incorporated for $200,000, will soon begin operations, with a daily output of four hundred cord tires and five hundred tubes. The organization, which plans to merchandise directly with its dealers, is headed by the following: W. G. Henne, president; D. T. Henne, vice president; W. F. Henne, secretary and treasurer; and L. L. Hinsch, general superintendent. W. G. Henne was, as general sales manager, connected with the Columbia Tire & Rubber Co., of Mansfield and Columbiana, Ohio, since its organization.

W. E. Boyd has been recently appointed receiver of The Lake Shore Rubber Co., manufacturer at Wellington, Ohio, of toy balloons, footballs, and rubber sundries. The company's affairs are said to be in excellent condition, while the corporation, which has been maintaining two factories at Wellington and Elyria, Ohio, is said to be solvent.

The Cleveland Tire Dealers Association has made formal protest against the resolution adopted by the board of directors of the National Tire Dealers Association at their meeting at Chicago on June 19, censuring the Firestone Tire & Rubber Co. for its leadership in the recent reduction in prices. The Cleveland association went on record as approving the recent price reduction.

The Pioneer Rubber Co., Willard, Ohio, announced that the payment of dividends at this time would be deferred. Vice president and general manager, J. C. Gibson and president T. W. Beelman explain that the company has so much capital tied up in stock and in goods already sent out, that it will be best to use the dividend money in the business. It is pointed out that dividends on preferred stock are cumulative. June shipments were $68,996.21 as against $18,413.03 in June, 1922.

The Cooper Corporation, Cincinnati, Ohio, is running night and day at full capacity, the present daily production being 900 tires and 2,000 tubes. A new tire, known as the Clincher Cooper Cord, and measuring 30 by 3½ inches, is now being manufactured, while the Findley tube is being made in 4-inch, 4½-inch, and 5-inch sizes.

The Wilson Rubber Co., Canton, Ohio, said to be the largest exclusive manufacturer of rubber gloves in the world, continues to operate at capacity as it has done since its organization seven years ago. The officers are J. S. Willis, president; Fred J. Wilson, vice president and general manager; Wendell Herbruck, secretary and treasurer. K. P. Herbruck has also recently become identified with the organization, and will assist Fred J. Wilson, the general manager.

Rubber Trade in the Midwest

Chicago

The Fidelity Tire & Rubber Co. has recently moved its general offices from Massillon, Ohio, to the Straus Building, Chicago, Illinois. The company will, however, continue to maintain its plant at Massillon, where "Fidelity" tires, Ford size only, are produced. Executives state that sales for the first quarter of the present year have shown an increase of approximately 50 per cent over the corresponding period of the previous year.

The Chicago City Rubber Works, Inc., manufacturing automobile tires at 1346-1348 Rawson street, Chicago, Illinois, announces the following changes in its executive personnel: J. Jozwiak becomes president, succeeding J. P. Drish; and S. Wleklinski becomes vice president, replacing J. Jozwiak. S. Strzelecki, treasurer, will in the future act as general manager.

The general offices and factory of the Western Rubber Mold Co., manufacturer of "Western" vulcanizing equipment, are now permanently located at 907-13 West 19th street, Chicago, Illinois. George R. Ludwig, former secretary of the Tire Dealers Association, is president of the new company; George E. Fidler is vice president; and P. J. Schram is secretary and treasurer.

The Brenner-Moxley-Mervis Co., a recently-organized Chicago concern, will manufacture copper rods and drawn copper wire for power transmission purposes. Nathan T. Brenner, president of the American Insulated Wire & Cable Co., also a Chicago concern and which supplies half of the insulated wire and cable now being used in the Midwest, will be president of the Brenner-Moxley-Mervis organization. N. T. Brenner, Jr., and Meyer B. Mervis, both also connected with the American Insulated Wire & Cable Co., will be respectively treasurer and secretary of the new company, while William J. Moxley and George T. Moxley will be vice presidents.

Midwest Notes

Tires and tubes heretofore manufactured by The Brunswick-Balke-Collender Co. at Muskegon, Michigan, will in the future be produced elsewhere, the organization requiring all available space at the Muskegon plant for the manufacture of other specialties. Under the name of the Brunswick Tire Co. a newly organized subsidiary company will continue the manufacture of casings and tubes, this branch of the business being also enlarged, while at

the same time the former high standards of construction will be maintained. B. E. Bensinger is president.

The Cupples Co., St. Louis, Missouri, plans to continue running its plant on a 24-hour schedule, although business conditions are somewhat unfavorable. The present output is approximately 1,500 tires and 4,000 tubes daily.

A. J. Stephens and George Kivovitch have acquired the plant formerly operated by the A. J. Stephens Rubber Co., Fifteenth and Chestnut streets, Kansas City, Missouri, and will carry on business under the same name as previously. The manufacture of tire accessories and fabric products will be continued, while other lines of mechanical rubber goods will also be added. The organization was originally established by A. J. Stephens in 1916, and incorporated in 1919, with a capital of $1,500,000. In January, 1922, the company went into receivership.

L. M. Van Riper, who for the past year has been connected with the Racine Rubber Co., Racine, Wisconsin, in the capacity of general sales manager, has been recently appointed vice president in charge of sales. At the same time the company's sales offices were transferred from the factory at Racine, Wisconsin, to 222 West 57th street, New York, N. Y.

The Rubber Trade on the Pacific Coast

Manufactured Goods

The marked revival in mining in the Rocky Mountain region has had a salutary influence on the Pacific Coast rubber trade. Tire manufacturers report a quickened demand from Denver, Salt Lake, and other large interior cities for truck and passenger car equipment; and the sales of hose, belting (especially conveyor and transmission), pump packing, brake lining, and general rubber mechanicals in that territory will be, it is said, for the 7-month period ended July 31, 1923, double the number for the corresponding period in 1922.

There has been no abatement in building activity on the Pacific Coast, and prosperity in that line is being well shared by rubber manufacturers and dealers, particularly in the Los Angeles section. Big oil interests that have been discouraging drilling by refusing to take more than a limited amount of the crude oil offered at the refineries are indicating that old conditions will soon obtain, much to the relief of rubber manufacturers who specialize on oil field supplies.

Several new truck manufacturing companies have started operations and are placing orders for solid tires. The market for rubber insulated wire is active in the leading coast cities, although a sharp falling off has been noted lately in purchases of high-tension lighting cables for the motion picture studios, which have recently been overproducing.

Los Angeles

The Goodyear Tire & Rubber Co., of California, had up to mid-July maintained a daily average from January 1 of 4,500 casings and 5,000 inner tubes, and the executives expect no slowing up in production in the near future. The June price cut is said to have resulted in a sharp increase in orders. F. X. Kennelly, manager of sales, recently returned from an extensive trade survey of the "hinterland states" and reports business prospects as very encouraging. The financial condition of the California Goodyear concern is reported as very creditable. This was reflected in a recent increase in the preferred stock (now a regular 7 per cent. dividend payer) to over $90 a share, the best price quoted since the stock suffered with others in the 1921 slump.

The management of the Goodyear factory gives much of the credit for the quantity and quality output of the works to the Goodyear Flying Squadron, an organization originally from the parent plant in Akron and since wholly recruited from the Los Angeles plant. These skilled workers are capable of operating in any department, and, after their three-years' course, they are awarded a Master Rubber Worker's Diploma. Some of them, it is said, could qualify for high positions.

The Reilly Rubber Co., Los Angeles, specializing solely in red laminated inner tubes, is making on an average 425 a day and distributing through several agencies. The company finds no trouble in getting plenty of good help.

Storage battery manufacturers report trade as very good. Coast branches of the large eastern concerns state that sales so far in 1923 range from 30 to 85 per cent. over those for the similar period in 1922. The Mack Battery Co., at 7336 South Alameda street, Los Angeles, has just had an addition made to its plant to enable it to turn out 200 batteries daily. The company is developing a good export trade.

J. B. Magee, manager of the Southern California branches of the United States Rubber Co., has returned from an extensive business trip through the East and Middle West, during which he studied methods of warehousing goods with a view of utilizing the knowledge obtained in the operation of the company's new building about to be erected at Eighth and San Pedro streets, Los Angeles, and which will be the largest of its kind on the Pacific Coast. Construction is scheduled to begin August 15 and the building is to be ready for use February 1, 1924.

Jack Ward, factory representative and coast manager for the Miller Rubber Co., Akron, Ohio, recently staged a striking demonstration of bathing belts, hats, caps, and shoes at Balboa Beach, California. The articles were worn by a group of Mack Sennett motion picture mermaids engaged in "shooting" a water comedy.

San Francisco

An output of 175 casings a day and an early prospect of over 200 is reported by the King Tire & Rubber Co., Foothill Boulevard and Stanley street, Oakland. The company's chief product is the C & L tire, marketed on the Pacific Coast by the Chanslor & Lyon Co., one of the largest automobile accessory concerns in the West. Black cords are made in all sizes, but fabrics only in 30 by 3½.

Recent visitors to the Pacific Coast were Cliff Slusser, assistant general manager, R. P. Dinsmore, chief chemist, and Fred L. Morgan, manager of the tire department, all of the Goodyear Tire & Rubber Co., Akron, Ohio; Myron C. Taylor, of the American Tire Fabric Co., New York; and G. A. Siegel, service manager of the Racine Rubber Co., Racine, Wisconsin.

A growing demand for staple and novel caps, capes, aprons, and other rubber articles of attire and surgical goods is reported by the I. B. Kleinert Rubber Co., 153 Kearny street. The Kleinert concern distributes its goods largely through wholesale druggists' supply houses and department stores.

The Universal Tire & Rubber Co. is one of the Pacific Coast rubber concerns that not only has experienced no slowing up in business, but has been obliged to provide for a market increase in orders for a large variety of rubber goods, chiefly mechanicals. The company, during the past year, has considerably expanded its area of distribution. The factory equipment is very much up to date.

The L. H. Butcher Co., Inc., with main offices at 239 Front street, New York, N. Y., is planning to occupy, about January 1, new branch offices and a warehouse in San Francisco, California. The new constructions will be in line with recent warehouse developments at Los Angeles, Portland, and Seattle. The Butcher organization specializes in colors, chemicals, and ingredients for the rubber trade.

Gilbert E. Foy, manager of the San Francisco branch of The Spreckels "Savage" Tire Co., San Diego, California, has been recently transferred as branch manager to Portland, Oregon. Louis E. Rice succeeds him as manager of the San Francisco branch.

The Obituary Record

President of the Rubber Association of America

HORACE DE LISSER, president of the Rubber Association of America, Inc., and chairman of the board of the Ajax Rubber Co., died at his home in New York, N. Y., on June 27. Death overtook him at the age of fifty-seven after about two months of serious illness.

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HORACE DE LISSER

Mr. De Lisser was born in 1866, in Kingston, Jamaica, where his father was for more than 20 years collector of His Majesty's customs, subsequently moving to the United States and entering the cotton business.

Horace De Lisser was educated in the elementary schools in Jamaica and the public schools of New York City, and after graduation entered the cotton goods business In 1894 he conducted a bicycle tire factory in England, which was later sold to a London syndicate. In disposing of this business he agreed to remain out of the rubber business for five years, and therefore took the United States agency for the Holbrook Sauce Co. of London.

At the expiration of the five-year agreement he identified himself with the International Tire & Rubber Co., of Milltown. New Jersey, resigning in 1905 to establish the Ajax Standard Rubber Co., of which the present Ajax Rubber Co., Inc., is the outgrowth. With the exception of two periods, of short duration, he has been president of the company since its formation, and has retained continuously the post of chairman of its board of directors. At all times he has been the guiding spirit, and under his leadership the company has made continuous progress.

In 1910 he resigned the presidency to assume the vice presidency and management of sales of the United States Motor Co., which position he resigned in 1912 to give again his whole attention to the Ajax-Grieb Co., sailing for Europe in July to study the situation of the tire business there. In August, that year, he married, at Covent Garden, London, England, Miss Ione Maggard.

During the Great War he was appointed to the "Business Men's Staff" of General Pershing, with the rank of major, to direct the erection of factories behind the firing lines in France. He was also chairman of the Liberty Loan Committee, representing the automobile and accessory trades, and was active in floating the several bond issues.

Besides being president and chairman of the board of directors of the Ajax Rubber Co., Inc., he was director and vice president of the Briscoe Motor Co., Jackson, Michigan; president and director of the Broadway Association of New York City; organizer and treasurer of the Annual Orphans' Automobile Day Association; member of the Executive Committee of the Tire Division and chairman of the Arbitration Committee of The Rubber Association of America.

He was an ardent yachtsman and a member of the Friars, Lambs, Lotos, New York Athletic, Great Neck Country, Bankers, Rotary and Traffic clubs of New York, as well as of high Masonic bodies and Mecca Temple, A. A. O. N. Mystic Shrine.

In addition to his New York residence at 200 West 57th street, Mr. De Lisser maintained a country place, Grenwold Estates, Great Neck, Long Island, where he devoted his leisure to the cultivation of rare orchids.

He is survived by his wife, Ione Maggard De Lisser, and a brother, Rudolph De Lisser. Funeral services were held on June 29 at the Masonic Temple, Sixth avenue and 23d street, New York.

One of the pioneers of the rubber and tire manufacturing industry, he soon became one of its most prominent figures. He had long been closely associated with the activities of the Rubber Association, and his services as chairman or as a member of several banquet and dinner committees were notable, for he had a peculiar aptitude for directing occasions of that sort. His entire career was colored by a unique and highly valuable capacity for successfully planning and directing cooperative organization activities, and he could always be counted upon for enthusiastic and intelligent support of commendable civic or other movements.

A gifted organizer and leader, enthusiastic, progressive and patriotic, his genial presence, staunch friendship, business integrity, and unfailing helpfulness will long be remembered by his associates and the rubber industry at large.

EXPORTS OF BALATA FROM BRITISH GUIANA INCREASE

Press reports state that exports of balata from British Guiana rose from 221,320 pounds gathered during the period January 1 to June 15, 1922, to 318,742 pounds collected during the corresponding period in 1923.

DUTCH GUIANA BALATA CROP

The Balata Compagnie "Suriname" reports that crops of balata amounted to 250,524 kilos during 1922 against 205,000 kilos during 1921. Although prices were not very favorable during the business year under review, subsequent improvement in the market made possible the sale of all unsold balata at higher prices, so that in the end a profit of 83,940 gilders was recorded against a loss of 119,674 gilders the year before.

A new method of exploitation has been introduced which requires less working capital than that which is at the command of the company. Consequently the surplus of 400,000 gilders will be used to buy up a part of the outstanding shares.

AMERICAN IMPORTS OF CRUDE RUBBER FROM BRAZIL

During the fiscal year ending June 30, 1914, Brazil exported to the United States 40,641,305 pounds of crude rubber, valued at $16,319,048. There was a decline, however, during the calendar year 1921 to 23,274,281 pounds, valued at $2,753,615, the figures rising again in the following year to 27,616,646 pounds, valued at $3,632,031.

CZECHOSLOVAKIA INTERNATIONAL SAMPLE FAIR

Special inducements are being offered to American importers and manufacturers by those interested in arranging for a Seventh International Sample Fair, to be held at Prague, Czechoslovakia, September 2 to 9, 1923. For further information address the Czechoslovak Legation, 2040 S street, N. W., Washington, D. C.

The Rubber Trade in Great Britain

By Our Regular Correspondent

The Institution of Rubber Industry

THE activities of the Institution are being prolonged well into the summer. On June 4, W. S. Flight read a paper before the London section on "The Use of Rubber Products as Dielectrics," which gave a good insight into electrical and physical matter with special reference to rubber basic materials that are used in the electrical industry. It was pointed out that on account of its high electric strength, cementing properties, and workability, rubber has been employed in making a variety of hard composite dielectrics, roughly classified as ebonite, stabilite, and miscellaneous. Stabilite was first produced in Germany for magneto manufacture, being a vulcanite heavily loaded with material other than rubber. Compounds of asbestos and rubber give a hard dielectric, though the asbestos causes it to be adversely influenced by a damp atmosphere besides reducing the electric strength. Molded materials, the author said, were largely used because they can be produced in intricate shapes rapidly and cheaply, the important desideratum being that the electrical and mechanical properties should be permanent and not depreciate with exposure to service conditions such as high temperature, strong sunlight and a damp atmosphere. An important point is that the molded article should not require machining, polishing, or finishing.

The testing methods were given at some length and it is important to note that uniformity has now been attained by suitable standard methods having been adopted jointly by the Institution of Electrical Engineers and the British Electrical and Allied Manufacturers' Association. In discussing the factors tending to limit the use of ebonite, Mr. Flight said that the maximum service temperature at which it was safe to use ebonite is about 50 degrees C. and as there was need for a higher temperature grade of ebonite, he thought a joint research by the Rubber Manufacturers' Research Association and the Electrical Research Association might be profitably instituted. A further disadvantage was the brittleness of ebonite, toughness and flexibility being always desirable features in electrical insulating materials. Research on this point was also desirable. Better resistance to hot mineral oil and exposure to light were also required, and then there was the question of finish, ebonite frequently requiring a machining operation while its competitor, synthetic resin, leaves the mold with a beautiful glossy finish.

The discussion on the paper elicited the opinion of more than one speaker that the proposed joint researches would be welcomed by those concerned with carrying them out. Dr. Stevens said that it had often been stated that plantation rubber would not give such good results as Pará rubber in making ebonite and asked if the author had any data on the point. A year or two ago the North British Rubber Co., he said, had made a number of samples from different varieties of plantation rubber on behalf of the Ceylon Research Fund and they all passed the severe Admiralty test. The author's reply was not very definite: there was a big gap, he said, between the Admiralty grade and the ordinary ebonite bought in the open market. The plantation rubber results quoted were certainly very good and he thought the matter might now be settled by a definite research.

Dr. Geer's Address

At a special meeting of the London Section June 25, Dr. W. G. Geer, vice president of The B. F. Goodrich Co., gave an address dealing with the achievements of the rubber industry and some current problems. Alexander Johnston, who was in the chair, said they were all intensely interested in the American rubber industry, the extraordinary rapidity with which it had grown and the vastness of the interests involved seeming more like a romance than a statement of bald facts. The guest of the evening was an example of the highest type of rubber executive and brought to the industry the calm judgment, clear intellect and cautious courage which were especially essential to the rubber industry today.

The author in discussing the development of the industry did not confine himself to the achievements of the American industry, because he thought Great Britain had played just as great, if not a greater part, in the development of this tremendous human service which the rubber industry gave, as had the Americans. The total world volume of the rubber trade in 1922 was about 300 millions sterling. Though the cost of tires was less today than in 1913, the mileage per tire had increased from about 3,500 miles to 10,000 with the cord tire. He challenged the other industries of the world to show any article which was being given to the consumers at a greater economy when the service the tire rendered was considered.

It was important, he said, that the quality of manufactured articles should be maintained, and the rubber growers also should maintain a high quality and also uniformity. Speaking of tire problems he specially mentioned the desirability of deciding which type of tire gave the greatest service and economy, and he advocated cooperation among the manufacturers of the world to this end. Simplification in style in boots and shoes was also desirable; at present there were about half-a-million designs. In view of the forthcoming shortage of carbon black, which was produced wastefully, he thought that the question of its replacement was a problem the chemist should tackle.

Another matter referred to was the adoption of some kind of standard package for crude rubber whereby there would be no further trouble from dirt and wood chips. With regard to the future he expressed himself as an incurable optimist; what with the extension of the motor car industry and new uses for rubber, more crude rubber than was ever produced before would be required in the future.

On the evening following the address, Dr. and Mrs. Geer were entertained at dinner by representatives of all sections of the rubber industry, the chair being taken by Sir Frank Swettenham, K. C. M. G., in the unavoidable absence of Sir Stanley Bois.

Airship Fabric

In H. A. Gardner's United States patent for fabric for airships a fabric base is impregnated with rubber and then coated with a drying oil. The method of procedure is to impregnate the fabric with rubber solution containing a vulcanizing agent and after this has dried a coat of oil that dries by polymerization is put on. If aluminum powder is to be used it is mixed with the oil.

The point about this that seems somewhat strange to rubber chemists of the old school is putting a film of drying oil on to a thin coat of rubber, as this, at any rate a few years ago, was understood to be a direct incentive to oxidation. If it has been shown that this apprehension was not well founded the fact deserves to be more widely known.

Cool Storage

Cold storage we have long had with us but cool storage is a development with a certain degree of novelty. Quite recently the Port of Manchester Warehouses, Limited, a company quite distinct from the Ship Canal, Limited, has opened a warehouse

with a capacity of 5,000 tons of produce requiring to be protected against summer heat. It has been specially insulated so that the temperature will not rise above 40 degrees F. Among the goods which can be stored here with advantage, we mentioned rubber goods, which are stated to deteriorate if subjected to ordinary or changeable temperatures. I don't know whether this statement will be generally accepted in the trade, though certainly some of our large manufacturers pay more attention to the condition of their storerooms than do retailers who are often indifferent to the effect of the sunlight on goods exposed in shop windows.

Thomas Rowley

I was interested to notice in the May issue of this journal the posthumous honor paid at the American rubber chemists' dinner to Thomas Rowley for his 1881 patent for using ammonia as an accelerator in steam vulcanization. I don't think the patent was ever used on the commercial scale but it is interesting to see that the idea is now recognized as being the base of the use of the modern nitrogenous accelerators.

Raincoats

It is surprising the number of people who ignore the distinction between the rainproof which contains no rubber and the waterproof or mackintosh which does contain it. There are, however, qualities of rainproofs which may be counted on to keep the wearer dry in the heaviest downpour. These are made of very fine wool so tightly woven that water will not penetrate the cloth even before it has undergone the special proofing treatment. It does not seem to be generally known that a raincoat may be washed without detriment, though it should be said that the process is not equally successful in all makes, a good deal depending upon the particular process which has been employed in the proofing. There are several of such processes in use and the different manufacturers keep their particular formulas as secret as possible.

Synthetic Resin Development

According to a patent granted to Plauson's (Parent Company) Limited, London, an artificial resin combined with rubber has been produced. The difficulty in the past has been due to the fact that the usual solvents are not capable of dissolving both rubber and the condensation products of formaldehyde and phenol. It is found that a solvent consisting of chlorhydrin and cyclohexanol is effective in acting on rubber and the other ingredient to form plastic masses. Sulphur may be combined with the mixture and mineral fillers added and such masses containing sulphur can be vulcanized to produce hard products if the sulphur content is high enough.

Weldbank Works Sold

The Weldbank works recently occupied by Chorley Rubber, Limited, Lancashire, are to be sold by auction as a going concern together with water rights, reservoirs, and the comparatively new machinery. Should there be no bid for the property as a whole it will be sold at piecemeal. This is one of the war-time promotions which did well for a time but when the slump came it got rather deeply into the hands of the bank. The company is now in voluntary liquidation, efforts to secure sufficient financial aid to keep it going having proved abortive.

Financial Notes

The Rapson Tyre and Jack Co. (of Europe), Limited, whose new works were opened last year near London, has been formed into a new public company, the purchase consideration being £300,000 in cash debenture stock and shares. A public offer has been made of £150,000 7½ per cent first mortgage debenture stock at £95 and £150,000, 8 per cent preferred ordinary shares. There are also £200,000 deferred ordinary £1 shares, making a total capital of half a million.

A circular sent out by the board of the India Rubber, Gutta Percha & Telegraph Works Co., Limited, indicates that the financial situation has improved although there will not be any interim dividend on the ordinary shares. An increased turnover is testified to, the new motor tire, Flexicord, extending its sales and the demand for golf balls was large and increasing. The S.S. "Silvergray" has been converted into a cable ship and one or two favorable orders for submarine cable have been secured.

Isleworth Rubber Co., Limited

A scheme of reconstruction of the Isleworth Rubber Co., Limited, against which there is a postponed petition for a compulsory winding up, is under consideration and will be presented to the court for approval. The company was a war-time flotation and the capital which it issued up to £252,650 out of £500,000 was later increased to provide for the extension of the works which are in the southwest London district. Besides mechanicals and tires many red rubber goods were made in competition with the old established firm of Wm. Warne Co., Limited, and as part of the reconstruction scheme an agreement has been made with Warne & Co., that, provided the scheme is sanctioned by the court, the two firms will be amalgamated. A feature of the scheme is a drastic writing down of the issued capital, the present shareholders being asked to subscribe additional capital to the amount of £87,200.

Rothband Honored

In the recent Birthday Honors list the name of Henry L. Rothband, a director of J. Mandleberg & Co., Limited, waterproofers, Manchester, appears as the recipient of a baronetcy. He is the author of the King's Roll scheme for the employment of ex-service men in commerce and industry.

Crêpe de Chine Rubber

Among the new articles now being manufactured by the Peachey Process Co., Limited, is a rubber material known as rubber crêpe de chine. It is a beautifully dainty, light and filmy material delicately colored and, of course, waterproof. It can be used in articles of clothing, for furniture, wall coverings, and the like

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The Rubber Trade in Europe

By Our Regular Correspondent

France

Marseilles being an important seaport, it is not surprising to learn that the principal use for industrial rubber goods here is in connection with marine boilers, ship repairs, etc. Rubber sheet packing with metal insert is the heaviest single item and is mostly of French manufacture. On the other hand, large quantities of American surgical goods—hot water bottles, syringes, bulbs, tubes and the like—are imported and distributed here. American rubber surgical goods and druggists' sundries have the reputation of being superior to the products of any other country.

Holland

A rubber propaganda division of the International Association for Rubber Culture in the Netherlands East Indies has been formed which will co-operate with the propaganda department of the Rubber Growers' Association. The new division will confine its activities to the Netherlands to begin with, but it is intended later on to extend these all over the continent of Europe. The members of the new Propaganda Committee include Prof. Dr. G. van Iterson, Jr., and Dr. R. van Rossem, advisor and director of the Ryksvoorlichtingsdienst (Government Information Service) at Delft; H. Ketner, M. Sanders, and J. Vorstelman. J. G. Fol was nominated secretary of the Propaganda Division.

The aim of the division is to promote the use of rubber. "Use More Rubber" is to be its slogan. Inventors of new uses of rubber will find sympathetic and helpful hearing. If a new invention possesses merit it will be carefully developed by the department, the rights of the inventor in each case being respected.

It will distribute news to those interested regarding new uses of rubber; will advise rubber manufacturers and extend various facilities to those contemplating the manufacture of new goods; will gather sample collections for exhibitions and fairs.

The 1922 report of the International Association for Rubber Culture in the Netherlands East Indies just received, shows that this association is trying to practice as it preaches and to set a good example, for the entire report, comprising 36 large pages besides covers of heavy stock, is printed on latex paper.

Wynand & Keppler's monthly rubber report for June, 1923, also has the announcement "Printed on latex paper" on the cover.

Holland's Rubber Industry

Holland has few rubber factories of her own and these are small. The two largest, Vredestein and Hevea, employ 500 to 600 workers when working to capacity. At present, general business depression and foreign competition, chiefly German, have checked the activities of local factories. Bicycle tires, solid tires and technical goods, all of the very best quality are produced here, also good automobile tires. Vredestein tires also find a market outside of Holland. Good quality is the first requirement here.

Holland offers a good, if limited, market for rubber novelties, such as dress shields, bathing caps, aprons, bibs, baby pants, and the like. American firms wishing to participate in the business should work through an exclusive agency to some established firm, the extent of the market scarcely warranting the opening of a branch.

Germany

It seems almost incredible that last year at this time the rate of marks was 402 to the dollar. Then it was considered impossible for Germany to hold out much longer with the mark well on the way to 1,000 to the dollar. Twelve short months, however, have not only seen marks drop to 1,000 to the dollar but to a point that places it below even the Austrian krone. And in spite of this, business is better than it was a few months ago when the government made frantic efforts to stabilize the mark at 20,000 to the dollar.

The reason is that every spurt of the dollar is followed by a rush of orders from people eager to stock up at the lowest price possible. On the other hand every time the dollar goes down consumers hold off in hopes that the dollar will continue to move downward.

Meanwhile prices, which a few months ago had undergone a slight reduction, are once again soaring. Tires and tubes are up 300 to 400 per cent; surgical goods are subject to a surcharge of 50,000 to 80,000 per cent; rubber raincoats have increased 80 to 175 per cent. Cables have been raised 450 per cent.

New Export Rulings

For some time past the publication of a list of German-made articles free from export restrictions has been expected. At last a list has been published which is not actually a free list but rather a general export permit for certain groups of products. Exporters of articles on the new list are obliged to hand over to the Reichsbank 40 per cent of their foreign bills received as payment. However, as indiscriminate enforcement in certain cases would cause exporters to buy foreign bills and further depress the mark, it has been decided to grant exemption or to reduce the required percentage in special cases. Almost all kinds of rubber goods came under the new ruling excepting hard rubber fountain pens with gold or gold-plated nibs, wringing machines with rolls wholly or partly covered with rubber, clothing and the like covered, impregnated or otherwise combined with rubber and rubber threads, particularly garment protectors, raincoats and the like. For these articles permits are still required but they are not subject to the new ruling regarding the foreign bills.

Conditions in Danzig

Increasing business activity is reported from Danzig. It seems that besides a near-boom in building, the free state is witnessing a marked increase in newly established industries and firms, many of which are connected with the rubber industry. There is consequently a good demand for technical goods of all kinds, including rubber goods. Poland, it appears, has ambitions to expand its own rubber industry, which at present is represented by a few small factories in Warsaw.

New German Goods

Two rubber novelties are advertised by the Uebersee Gummiwerke A.-G., Hamburg-Wandsbek—a new sport belt (The Belinde) and boat cushions. Both the belts and cushions are made of sponge rubber in a variety of colors, the boat cushions being obtainable in the colors of the various rowing and boating clubs.

An improved machine for stamping rubber heels and soles has recently been introduced by the Maschinenfabrik Moenus A.-G., Frankfurt-am-Main. It is equipped for automatic feeding and discharging the stamped articles. It cuts heels and soles of vulcanized or unvulcanized rubber and could also be used for materials like celluloid, vulcanized fiber and the like.

Company Notes

The Gummiwerke Elbe A.-G., Piesteritz bei Klein-Wittenberg (Elbe), celebrated its 25th anniversary. Originally formed to make Oxylin rubber substitute—linseed oil and raw jute after an English patent—the firm devoted itself more and more to the manufacture of rubber goods and introduced its articles into the chief markets of the world. Now rubberized fabric, toy balls, heels, soles, thread, dental rubber, insulating tape, technical and electrotechnical goods of all kinds in both soft and hard rubber are produced by the company.

High dividends are the order of the day here. Thus the Gummiwerke Elbe A.-G., declared a dividend of 100 per cent; C. Müller Gummiwarenfabrik A.-G., with net profits of 12,876,889 marks, also turned out 100 per cent dividend. At a general meeting recently held it was proposed to combine the interests of these two firms, but the plan fell through. The Phil. Penin Gummiwarenfabrik A.-G., Leipzig-Plagwitz, turned out dividends of 300 per cent. These dividends sound astonishing, but when the amounts are turned into dollars or gold marks they are insignificant.

RUBBER PAVEMENT IN BRAZIL

Brazil is evidently as anxious to use and to encourage the use of more rubber as any other producing country and if certain plans are carried out will soon be able to boast of rubber paved streets in its capital, Rio de Janeiro; for we read in *A Lavoura,* that the Federal government has been authorized to assist one Alberto G. Haepfner to demonstrate the practicability of his system of paving with Brazilian rubber. The Federal government may open credits for this end and, if it thinks fit, agree with the Prefect of the Federal district to experiment with this paving at certain points in the capital where traffic is heaviest.

BRITISH OWNERSHIP IN DUTCH EAST INDIES

Authorities state that of the rubber plantations maintained in the Netherlands East Indies about 30 per cent, or 270,880 out of the 885,000 acres planted, are owned by British interests. Of this British-owned area about 92½ per cent, or 249,613 acres, are on the voluntary restriction list. During 1922 the Netherlands Indies exported 71,725 tons of crude rubber, of which 31,173 tons were from Java and 41,552 tons from Sumatra.

The Rubber Trade in the Far East

By Our Regular Correspondent

Malaya

THE honor system has been tried here in connection with restriction and has officially been pronounced practically a failure.

When it was decided to effect restriction by cutting down exports instead of production, the idea was to make matters simpler both for the government and the planters by resorting to a course of action that would be less complicated for the former and less irksome for the latter. But the government relied upon producers to do their bit and to stick to the spirit of the restriction law.

Subsequent events have proved that this confidence was, to a certain extent, misplaced. From the very outset producers sought to evade the law by hoarding and by buying up coupons from their small neighbors. Hoarding showed the way to smuggling and the growing practice of exchanging licenses for coupons called for such a number of coupons that forgeries became difficult to detect, especially when there was a rush. As a result, more rubber went out than should have left the country, and it has openly been said that should restriction be stopped tomorrow there would not be 5 per cent. more exports than there are at present.

Of course, forged coupons and smuggling are not responsible for all the excess rubber that is finding its way out of the country. It should be remembered that there was, and probably could be, no proper investigation of estates, so that while some were not allowed to export their fair share because of the unfair working of the Duncan scale, others again were allowed more than they ever had produced or could produce, which led to a traffic in coupons and caused another addition to excess exports.

On the other hand, paradoxical as it may seem, restriction directly aided in increasing the amount of rubber that came on the market from Malaya. For many estates which had been partly or wholly closed down, owing to the slump, could be profitably worked again at the higher prices ruling immediately after restriction was inaugurated.

Taking into consideration this, besides smuggling and coupon forgery, as well as the fact that a good many large concerns were voluntarily restricting about 25 per cent. during 1922, and that there were large accumulated stocks to be got rid of, it is not surprising that a 40 per cent. restriction has had as little effect as has been the case up to the present.

New Rulings

The government has realized the necessity for tightening the law and for stopping up the more conspicuous loopholes and new rulings have accordingly been formulated.

One set of rules is aimed at imports of rubber on small vessels. Another provides that no license or coupon shall be issued except to the registered owner or proprietor of a holding, or his agent, and that any person who transfers a license coupon or other document authorizing rubber export, except as stipulated, shall be liable to a fine not exceeding $5,000 or a year's imprisonment. This clause making coupons non-transferable will be particularly gratifying to all those who are anxious to see the scheme successful.

One of the chief difficulties the authorities have to cope with is the enforcement of the law. The police and civil service have already been drawn upon, but more men are required and it has been suggested that planters be asked, with the full permission of their employers of course, to join the preventive staff temporarily.

As a result of inspection, the original standard production of estates over 200 acres in the Federated Malay States has been cut down by about 2,000 tons. The standard production of estates of over 200 acres is 208,967,671 pounds, according to a report by the controller of rubber exports.

Opposition to New Rulings

The Singapore Chamber of Commerce and Exchange does not approve of all the measures proposed for dealing with smuggling. The committee is of opinion that so far from limiting the exports from Malaya and the Dutch colonies combined, the measures proposed would only result in rubber being smuggled from the peninsula and diverted to Batavia and Medan.

Again the regulation requiring all foreign rubber to be accompanied by certificates of origin was considered objectionable and opposed to principles of free trade, besides—and here is the rub—traders in rubber from the small Dutch holdings would not want to bother about certificates of origin but would sell their produce in Dutch markets, to the detriment of Singapore.

The committee further opined that there was no conclusive proof that the excess of Malayan exports was due mainly to smuggling; it could probably be accounted for partly by liquidation of stocks. Its view was that the solution of the problem of smuggling lies in the vigorous tightening up of preventive measures on the coasts of the peninsula.

Control Schemes

The introduction of the Stevenson Act put an end to the pastime of suggesting new plans. However, there impends a new batch of schemes aimed at improved control. The *Straits Times* publishes two, one of which embodies features of the other.

The first plan would have no rubber exported from any place in Malaya except from bonded warehouses controlled by government. Any rubber found on any vessel in the Malayan waters without a permit authorizing export, to be confiscated; the waters of course to be patrolled. This scheme might prove expensive, but the *Straits Times* thinks the expense would be justified if the plan would work.

The second plan is more elaborate and provides for a sworn declaration of actual production, direct dealing with each estate, bonded warehouses through which consignments of rubber must move, and certificates of origin.

Latex Shipments

Shipments of latex from Malaya amounted to 5,302 gallons, value $8,446 during April, 1923. For the first four months of 1923 the totals are 50,261 gallons, value $80,541.

Ceylon

Following Malaya's example, Ceylon too intends to make some changes in the rubber restriction law. For some time past two new rules have been under consideration, one making certificates non-transferable except upon a bona fide sale of rubber covered by a certificate, and another providing that rubber for which a certificate is granted must be actually produced on the estate for which a certificate is issued. This will curb objectionable traffic in certificates but at the same time render illegal two practices hitherto considered legitimate. Thus some estate owners decided not to tap but to sell their coupons to others who have surplus rubber, while companies owning more than one estate were given to understand that deficiencies in production on one estate could be made up by surplus production on the other.

This system made for economy in labor and several companies adopted the practice. It has been suggested that it is inadvisable to withdraw these privileges from companies and that some exception should be made.

Regarding the Malayan proposal to revise the assessment, it is doubtful whether Ceylon will agree to a lower standard of production. There is a feeling here that there is something wrong in Malaya. It seems that in May exports were 19,000 tons as against the 60 per cent export allowance of 13,710 tons.

This surplus may be due to smuggling, but it is felt that while exports remain so high Malaya can hardly be said to be giving the scheme a fair trial.

There is another aspect to the situation. Since stocks in London are reported to be decreasing in spite of the fact that more rubber is now being exported than before restriction, the inference is that the rubber situation has been improving without the aid of restriction; in short, the opinion of those who held that the rubber situation would right itself without artificial bolstering seems to be justified.

Be that as it may, it is regarded as highly improbable that Ceylon would agree to this proposal of lowering the standard of production. For while Malaya is exporting more than her allotment, Ceylon, which is allowed 3,000 tons a month, exported in April only 2,524 tons, while in May, with a 5 per cent increase allowed, the total was only 2,722 tons. Evidently, then, Ceylon is restricting.

At first Ceylon had some difficulty in the matter of assessment of small holdings. In many cases over-assessment took place. But during the last few months these small estates have been thoroughly investigated and allowances considerably reduced, with what effect the above figures prove.

Now it is felt here that if Malayan excess exports are caused by smuggling, an alteration in the standard of production would hardly remedy the situation. If, however, over-assessment is partly responsible for the thwarting of the aims of restriction in Malaya, why then Malaya should do what Ceylon has already done and not ask Ceylon to join a plan which is absolutely unnecessary here.

Netherlands East Indies

"Restriction your name is Fiction," says a contributor to the *Nederlandsch-Indisch Rubber-en Thee Tydschrift* of May 15, and goes on to prove what he says.

The writer has at his disposal figures up to and including March, 1923, and beginning with September, 1922, gives the monthly figures of total exports from Malaya, imports, Malayan figures only, and total for the last quarter of 1922 and the first quarter of 1923, thus:

	Total Exports from Malaya	Imported Rubber	Malayan Rubber Only	Quarterly Exports
September, 1922 .....tons	20,238	2,973	17,265	.....
October, 1922	27,466	3,995	23,471	
November, 1922	21,624	4,283	17,341	54,669
December, 1922	18,427	4,570	13,857	
January, 1923	22,871	4,357	18,514	
February, 1923	19,907	4,089	15,818	52,870
March, 1923	23,646	5,108	18,538	

From these figures it will be seen that October shows a considerable increase in exports due, of course, to the rush to get rubber out before restriction was enforced. The falling off in December of Malayan exports was probably caused by a holding off of American buyers who wished to show a favorable balance at the end of the year. The other months show small fluctuations. However, the exports of the first quarter of 1923 are only three per cent less than that for the last quarter of 1922, and every month in 1923 has seen exports exceed the restricted allowance.

The figure 52,870 tons, taking a 40 per cent restriction into consideration, means a standard production of 352,470 tons per annum for Malaya alone, exclusive of re-exports of non-British rubber!

The export figures for Malaya, including foreign rubber, were 142,722 tons for 1918, 236,977 tons in 1919, 229,481 tons in 1920, 188,881 tons in 1921 and 248,158 tons in 1922. At the present rate standard production is 100,000 tons more than the total exports from Malaya including rubber from other countries ever were!

According to Rickinson, 1920 export figures—which form the basis of restriction—were 229,000 tons. At the rate of export at present and with further quarterly releases of 5 per cent, the export from Malaya for 1923 will be 221,822 tons under restriction, while the unrestricted exports for 1920—exclusive of 29,000 tons for foreign rubber, a very low figure—were 200,000 tons!

At the same time it should be noted that stocks are decreasing in London. Apparently, then, consumption is now equal to unrestricted production.

On the other hand, attention is called to greatly increased amounts of foreign rubber exported from Malaya, the increase of the figures for March, 1923, as compared with those for September, 1922, being 72 per cent. Most of this rubber comes from the native plantations in the Dutch colonies. Statistics of exports of native rubber from these parts during 1922 show the following quantities: Banjermassin, 8,008 tons; Pontianak, 2,687 tons; Lambas, 1,936 tons; Riouw and dependencies, 4,164 tons; Palembang, 894 tons; Djambi, 9,678 tons; total, 27,367. Thus about 2,300 tons of native rubber were exported per month, all of which probably went to Singapore.

Now as the production and shipment of native rubber react to market conditions much more sharply than is the case with the European product, the considerable increase in foreign shipments pointed out above is probably for the greater part due to a considerable growth in exports of rubber from Sumatra and West Borneo following the rise in the price of rubber.

The writer concludes that these increasing amounts of native rubber will have to be taken into account in judging market conditions in the near future.

Here I must add that some time ago when Dutch cooperation with the British in the matter of restriction was being considered, several articles on native rubber and the extent of the shipments appeared in local papers.

It was pointed out that native rubber might at some future time not far distant—if not now—wreck any scheme for artificially bolstering up the price of rubber, and at least one writer expressed the fear that unless the government took measures to prevent it, the rubber industry might fall into the hands of the natives.

Nationality in the Rubber Industry

The Commercial Association of Medan, Sumatra, publishes figures concerning the extent and yield of plantations under various crops, including rubber, according to nationality, situated on East Coast of Sumatra.

For rubber the figures at the end of 1922 were as follows:

	Area, Hectares	Area Producing, Hectares	Crop, Kilos.
Dutch	51,374	31,665	11,866,896
British	47,300	37,283	12,284,260
American	26,623	18,117	6,422,755
Franco-Belgian	14,491	10,759	3,897,641
Dutch Indian	11,554	6,671	2,275,243
German	1,760	1,660	852,504
Japanese	4,709	1,080	381,858
Swiss	1,862	985	380,632
Danish-Norse	2,943	.....	.....
Shanghai	1,012	457	38,200

The total area under rubber was 163,627 hectares, of which 108,677 hectares were productive, the total yield being 38,359,989 kilos.

These figures show that the Dutch estates cover a larger area than they are usually credited with, and seem to indicate that the proportion of foreign capital invested here is exaggerated Thus Symington and Sinclair in their 1922 report say that the Dutch plantations in their colonies cover only an eighth of the total acreage under rubber and that the British estates cover about one-half of the total area. Although the association does not know the figures for Java, it believes that judging from the Sumatra figures, Symington and Sinclair's dictum can hardly be correct.

Recent Patents Relating to Rubber

The United States

Issued* June 5, 1923

NO. 1,457,390 Valve for pneumatic tire. H. Plasschaert, Wachtebeke-Lez-Grand, Belgium.
1,457,412 Pneumatic tire. L. G. Williams, Corsyrhelig, Godrergraig, Wales.
1,457,453 Drawing roll. P. A. Murphy, Lynn, Mass., assignor to Textile Rubber Co., Boston, Mass.
1,457,482 Corset with elastic inserts. J. L. Alberts, New York, N. Y.
1,457,512 Armored tire. E. Favary, New York, N. Y.
1,457,559 Tie with elastic insert in neckband. J. E. Stone, Toronto, Ontario, Canada, assignor to The S. K. Neckwear, Limited, Toronto, Canada.
1,457,846 Blow-out patch. T. H. McDonald, Adelanto, Calif.
1,457,858 Swimming mitt. W. A. Ruddell, Asbury Park, N. J.
1,457,888 Demountable rim. L. G. Hackworth, Ruble, Mo.
1,457,942 Pneumatic tire. W. E. Shively, assignor to the Goodyear Tire & Rubber Co.—both of Akron, Ohio.
1,457,952 Elastic garment supporter. F. E. Williams, assignor of one-third to A. L. Kelly and one-third to F. S. Kelly—all of Hayward, Calif.
1,458,007 Demountable rim. M. Seed, Billett, Ill.
1,458,019 Life preserver. Tokujiro Aoki, Tokyo-Fu, Japan.
1,458,040 Cushion tire. C. Escher, Jersey City, N. J.
1,458,041 Nursing-bottle cover. P. Ferris, Westwood, Calif.
1,458,053 Tire patch. W. G. Handly, St. Albans, Vt.
1,458,082 Ventilated sanitary garment. J. Stein, New York, N. Y.
1,458,117 Spring tire. T. H. Gammon, Los Angeles, Calif.

Issued* June 12, 1923

1,458,148 Cushion wheel. R. Reed, Cincinnati, Ohio.
1,458,191 Armored tire. J. C. Mire, Feitel, La.
1,458,201 Shoe sole. J. H. Stedman, Braintree, Mass.
1,458,257 Detachable heel. J. Van Melle, Dubuque, Iowa.
1,458,267 Resilient tire. V. L. Buchman, Trenton, N. J.
1,458,319 Corset. S. E. Bemis, Philadelphia, Penn.
1,458,353 Hose supporter. B. Morse, New York, N. Y.
1,458,379 Combined rubber veneer and tread. H. N. Atwood, Smithfield, N. C., assignor to Rubwood, Inc., Lawrence, Mass.
1,458,380 Combined rubber veneer wheel and tread. H. N. Atwood, Smithfield, N. C., assignor to Rubwood, Inc., Lawrence, Mass.
1,458,406 Sectional and demountable rim. L. B. Harvey, assignor to Harvey Rim & Wheel Co., Inc.—both of Buffalo, N. Y.
1,458,446 Rubber heel. C. W. Shaeffer, Chicago, Ill.
1,458,458 Pneumatic tire. M. J. C. Andre, Paris, France.
1,458,532 Wheel and tire for road vehicles. F. W. Lanchester, London, England.
1,458,629 Pneumatic tire. H. K. Raymond, Akron, Ohio, assignor to The B. F. Goodrich Co., New York, N. Y.

Issued* June 19, 1923

1,458,926 Spring cushion tire. J. A. Xeres Burgos, Manila, P. I.
1,458,986 Hose supporter. S. E. McCreary, Highland, Kansas.
1,459,014 Pressure gage. C. R. Crosno, Albuquerque, N. M.
1,459,018 Cushioned wheel and tire. L. De Wolf, St. Nicholas, Belgium.
1,459,145 Rubberized bust support. M. Van Deusen Davis, assignor of one-half to C. Van Deusen—both of Milwaukee, Wis.
1,459,172 Inner tube. J. C. Wise, Los Angeles, Calif.
1,459,191 Liquid container. F. O. Williams, Brookline, Mass.
1,459,228 Rubber hair curler. O. D. McClintock, Chicago, Ill.
1,459,346 Shim plate for demountable rims. A. E. Shea, Eckley, Colo.
1,459,362 Tire. M. T. Conroy, Akron, Ohio.
1,459,376 Detachable tire tread. E. A. Parker and H. G. Evitt, both of Baltimore, Md.
1,459,377 Reenforcing strip for tires. M. B. Peeples, Scotia, S. C.
1,459,401 Reenforced ribbed pneumatic tube. L. W. Hottell, Chicago, Ill.
1,459,430 Rubber-cushion wheel. E. H. Aitkens, Sydney, New South Wales, Australia.
1,459,509 Cup packing for pumps. P. J. Knothe, Fort Wayne, Ind., assignor to Montpelier Manufacturing Co., Montpelier, Ind.
1,459,529 Pneumatic tire. T. Griffiths, Kensington, Liverpool, England.
1,459,544 Sectional air tube. T. B. McLeroth, assignor to T. B. McLeroth, Ltd.—both of London, England.
1,459,547 Elastic woven fabric. G. C. Moore and T. F. Moore, Westerly, R. I.
1,459,555 Repair vulcanizer. C. A. Shaler, Waupun, Wis.

Issued* June 26, 1923

1,459,736 Tire with inflatable segments. S. Kramer, Newark, N. J.
1,459,750 Shirt retainer strap with elastic section. D. Schreiber, New York, N. Y.
1,459,751 Tire valve tool. M. C. Schweinert, New York, N. Y.
1,459,887 Tire patch. E. C. Handschug, St. Louis, Mo.
1,459,939 Blow-off valve for pneumatic tires. A. H. Urtubees, Minneapolis, Minn.
1,459,993 Demountable rim. W. Ryan, Paso Robles, Calif.
1,460,187 Spring tire and rim. R. B. Whitman, Boston, Mass.
1,460,247 Tire. J. G. Johnson, Gordon, Penn.
1,460,253 Cushion wheel and tire. T. C. Lackland, Atlanta, Ga.
1,460,277 Elastic corset with reinforcing strips. A. Rocke, assignor to Peerless Corset Co., Inc.—both of New York, N. Y.
1,460,292 Reliner for tires. I. C. Vance, Howell, Arkansas.
1,460,355 Air and dust cap for pneumatic tires. A. K. Hinchman, assignor of one-half to R. M. Adams—both of Philadelphia, Penn.

*Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

The Dominion of Canada

Granted May 15, 1923

230,982 Resilient tire. C. Berne, Bridgeport, Conn.
231,055 Demountable rim. J. Reipas, Sudbury, Ontario, Canada.
231,056 Brake band lining. R. Reynolds, Cincinnati, Ohio.
231,093 Tire liner. The Dunlop Tire & Rubber Goods Co., Ltd., assignee of T. A. Burns—both of Toronto, Ontario, Canada.
231,153 Cushion tire. E. W. Snyder, Kittanning, Penn.
231,154 Cushion tire. E. W. Snyder, Kittanning, Penn.

Granted May 22, 1923

231,195 Detachable tread tire. E. C. Jacobson, Roy, Washington.

Granted May 29, 1923

231,346 Pneumatic tire comprising pressure balls. A. J. Ostberd and A. Kenny, co-inventors, both of Richmond, Victoria, Australia.
231,406 Dust cap for tire valves. E. T. Muchler, Miami, Florida.
231,481 Rubber soled shoe. P. J. Finneran, Boston, Mass.

Granted June 5, 1923

231,568 Sponge rubber truss pad. T. J. Le Cras, Toronto, Ontario, Canada.
231,590 Toy balloon. F. A. O'Connor, Toronto, Ontario, Canada.
231,628 Hose supporter. A. M. Ziegler, Newton, Mass.
231,661 Corset with elastic sections. Kops Bros., Ltd., of Canada, Toronto, Ontario, Canada, assignee of Daniel Kops, New York City.
231,690 Rubber wheel. J. E. Cleland and H. W. Lucas, assignee of one-half of the interest—both of Montreal, Quebec, Canada.

Granted June 12, 1923

231,800 Resilient heel lift. C. H. Oakley, Trenton, N. J.
231,801 Resilient heel lift. C. H. Oakley, Trenton, N. J.
231,824 Cushion heel. A. Schwartz, Lorain, Ohio.
231,903 Dust cap. The A. Schrader's Son, Inc., New York City, assignee of H. P. Kraft, Ridgewood, N. J.
231,911 Resilient tire. The Wright Rubber Products Co., assignee of L. J. D. Healy—both of Racine, Wisconsin.
231,913 Reinforcement for inner tube. H. C. Privett, C. R. Privett and H. L. Privett, assignee of one-fourth of the interest, all of Long Beach, Calif.
231,923 Tire valve and gage. W. C. Loy and F. E. Bryant, assignee of one-half of the interest—both of Rochester, Indiana.
231,946 Rubber heel. The Wids Co., St. Paul, Minn., assignee of G. C. Wood, Boston, Mass.

Granted June 19, 1923

231,951 Demountable rim. R. H. Pierce and G. A. Anderson—both of Eugene, Oregon.
231,975 Solid tire. V. M. Cabretosa, Barcelona, Spain.
231,985 Cushion tire. C. Escher, Jersey City, N. J.
231,986 Cushion tire. C. Escher, Jersey City, N. J.
232,001 Rim and tire. H. E. A. Landsmand, Hoboken, N. J.
232,021 Puncture proof tire. G. F. Mohlman, Edmonton, Alberta, Canada.
232,046 Non-skid sectional tread. G. L. Simpson, Santa Ana, Calif.

Granted June 26, 1923

232,176 Armored tire. E. Brunswick, Paris, Seine, France.

The United Kingdom

Published May 30, 1923

195,667 Floating rubber toys. Plantation Rubber Manufacturing Co., Ltd., and M. M. Dessau, 14 Mincing Lane, London, England.
195,668 Toys mounted on rubber base. Plantation Rubber Manufacturing Co., Ltd., and M. M. Dessau, 14 Mincing Lane, London, England.
195,670 Toy balloon containing suspended rubber airplane. Plantation Rubber Manufacturing Co., Ltd., and M. M. Dessau, 14 Mincing Lane, London, England.
195,671 Crepe rubber cushions, life-belts, etc. Plantation Rubber Manufacturing Co., Ltd., and M. M. Dessau, 14 Mincing Lane, London, England.
195,672 Cores for balls, floats, buoys, cushions, buffers, washers, etc. Plantation Rubber Manufacturing Co., Ltd., and M. M. Dessau, 14 Mincing Lane, London, England.
195,714 Rotating mudguard. E. O. Griffiths, Maes-y Ffrwd, Upper Mill, Llanelly, Carmarthenshire, England.
195,740 Corset with elastic inserts. L. J. A. Amyot, 29 Dorchester street, Quebec, Canada.
195,910 Combination wheel, tire and rubber mudguard. H. S. Skenfield, 57 Fishponds Road, Eastville, and H. J. Webber, 13 Harrow Road, Brislington—both in Bristol, England.
195,917 Cushion wheel and tire. R. H. Philpott, 2 Siren Cottages, Cuckfield, Sussex, England.
195,919 Pneumatic shock absorbers. C. E. Holden, 28 Wood street, Deansgate, Manchester, England.

Chemical Patents will be found on page 713, Machinery and Process Patents on pages 716-717.

Published June 6, 1923

195,999 Devices for washing and cleaning. Plantation Rubber Manufacturing Co., Ltd., and M. M. Dessau, 14 Mincing Lane, London, England.

196,011 Tobacco pouch. Plantation Rubber Manufacturing Co., Ltd., W. Luffsmith and M. M. Dessau, 14 Mincing Lane, London, England.

196,026 Buffers for garment racks. F. Howard, 180 High Barn street, Royton, near Oldham, England.

196,117 Telescoping crutch or walking stick with rubber pad. H. Rivett, 25 Pembroke Road, Erith, Kent, England.

196,154 Rubber spring. Spencer, Moulton & Co., Ltd., G. and R. T. Glascodine, 2 Central Buildings, Westminster, England.

196,176 Flexible rubber ruler. F. M. Molony, 104 Wymering Mansions, Maida Vale, London, England.

196,185 Castor cup with rubber pad. N. S. McMurtrie, Heatherygate, Wishaw, Lanarkshire, England.

196,186 Truss-pads. E. T. W. Dennis, 66 Scalby Road, Scarborough, England.

196,229 Tire tread. North British Rubber Co., Ltd., and A. Johnston, Castle Mills, Fountainbridge, Edinburgh, Scotland.

196,257 Window frame for vehicles. Detroit Rubber Products, Inc., 565 East Jefferson avenue, Detroit, Michigan.

Published June 13, 1923

196,277 Combined cushion and pneumatic tire. E. E. Thrasher, 220 East Race street, South Cumberland, Maryland.

196,294 Driving belts comprising rubber. E. Koenemann, 19 Duisburgerstrasse, Wilmersdorf, Berlin, Germany.

196,297 Tire patch. Virginia Carolina Rubber Co., Richmond, Va.

196,320 Rubber and metal pad cleaning device. Plantation Rubber Manufacturing Co., Ltd., and M. M. Dessau, 14 Mincing Lane, London, England.

196,424 Rubber and fiber paving blocks. A. B. Horne and A. J. Hubbard, Ditton Place, Balcombe, Sussex, England.

196,565 Splash guards for motor vehicles. A. Henningsen, 5 Ny Toldbogade, Copenhagen, Denmark.

Published June 20, 1923

196,703 Stapling rubber sole pads. A. A. Crozier, 75 Lansdowne Road, West Didsbury, Manchester, England.

196,704 Rubber dyeing sticks. J. H. Heap, Brookfield, Rochdale, Lancashire, England.

196,749 Tire repair patches. F. W. Farr, Reclaim Works, Henry street, Northampton, England.

196,761 Motorcycle footboard of rubber. W. G. Coram, 140 Victoria street, Bristol, England.

196,771 Vulcanite kettle handle. P. H. Jones, Ash Hill, Compton, and C. E. Dodd, 68 Wood Road, Tettenhall Wood—both near Wolverhampton, England.

196,833 Tapping tools. P. C. Rushen, 28 Southampton Buildings, Chancery Lane, London, England.

196,862 Horseshoe pad. E. E. Cox, 34 Shude Hill, H. White, 108 Alderson Road, and F. Beeley, 23 Porter street, all in Sheffield, England.

196,870 Non-skid horseshoe. T. R. Marsh, Gelli Unig Farm, Pontywain, Monmouthshire, England.

196,900 Spring tire. K. F. Koning, 238 Schenkstraat, The Hague, Holland.

196,904 Massage appliance. Van Ess Laboratories, Inc., 5007 Lake Park avenue, Chicago, Ill.

New Zealand

Published May 3, 1923

47,148 Milking machine teat-cup. C. H. Davis, Ridgway street, Wanganui, N. Z.

48,160 Rim. J. Stungo, 511 C. P. R. Building, Toronto, Canada.

Germany

Design Patents Issued with Dates of Issue

846,127 (April 3, 1923.) Rubber bellows holder. Franz Geyer, Ilmenau in Thüringen.

846,379 (March 22, 1923). Injection cannula for intravenous injections. Willy Kiel, Weisestrasse 16, Neukölln.

846,433 (April 23, 1923). Multicolored flamer of sheet rubber. Harburger Gummiwarenfabrik Phoenix A.-G., Harburg a. E.

846,733 (April 23, 1923). Atomizer. Josef Pelikofer, Stephansposching, Niederbayern.

846,857 (May 4, 1923). Diabolo game. Franz Clouth Rheinische Gummiwarenfabrik A.-G., Köln Nippes.

846,934 (April 3, 1923). Washable rubber doll enameled in colors. Harburger Gummiwarenfabrik Phoenix A.-G., Harburg-Elbe.

846,974 (March 29, 1923). Rubber tires, grooved for attachment, for baby carriages and ambulances. Hubert Bileck, Corbach, Waldeck.

846,981 (April 9, 1923). Rubber sole with pattern on reverse side. W. Goy & Co., Frankfurt-am-Main.

847,027 (March 29, 1923). Rubber figure with wooden foot. Fr. Herrmann, Seiferitz-Meerane, in Saxony.

847,086 (March 28, 1923). Protective cover for damaged collars of rubber, celluloid or the like. August Graf, Detmoldstrasse 3, Hannover.

847,168 (April 21, 1923). Rubber heel attachment. Albin Hohmann, Frankenstrasse 3, Dortmund.

847,329 (April 27, 1923). Money counter's rubber ring. Max Schubert, Jakobstrasse 32, Görlitz.

847,387 (April 16, 1923). Insulating band. Karl Thürmer, Ferdinandstrasse 63, Hamburg.

847,411 (February 8, 1923). Rubber sleeve protector. Gummiwarenfabrik M. Steinberg, Köln-Lindenthal.

Germany

Patents Issued with Dates of Issue

376,937 (April 26, 1921). Waterproof cover for folding boats. Johann Klepper & Co., G. m. b. H., Rosenheim a. Inn.

377,843 (September 27, 1922). Rubber scraper. Paul Zippel, Bunzlau.

377,972 (January 31, 1922). Rubber tire. Gottlieb Wollpert, Friedbergerstrasse 5, Augsburg.

378,067 (April 3, 1921). Bulb Syringe. Karl Menchen, Lindwurmstrasse, 72, Munich.

378,390 (September 20, 1921). Adjustable speculum. Dr. Paul Markovitsz, Budapest; represented by Dr. J. Friedmann, Berlin, W. 15.

378,485 (October 1, 1920). Intra-uterine pessary. Reischach & Co., G. m. b. H., Berlin.

378,714 (February 26, 1921). Self-acting injecting apparatus. Dr. Charles de Montet, Veney, Switzerland; represented by K. Ranfft, Berlin, S. W. 61.

378,715 (October 22, 1921). Medication syringe. Adolf Pochwadt, Steglitzerstrasse 18, Berlin.

Trade Marks

The United States

Two Kinds of Trade Marks Now Being Registered

Under the rules of the United States Patent Office, trade marks registered under the Act of February 20, 1905, are, in general, fanciful and arbitrary marks, while those registered under the Act of March 19, 1920, Section 1 (b), are non-technical, that is, marks consisting of descriptive or geographical matter or mere surnames. To be registered under the latter act, trade marks must have been used for not less than one year. Marks registered under this act are being published for the first time when registered, any opposition taking the form of an application for cancellation.

Granted June 12, 1923, Act of February 20, 1905

169,130 Representation of an elephant's head, with the trunk forming a circle, the end of which suggests a tire—tires, casings, and inner tubes. The General Tire & Rubber Co., Akron, Ohio.

169,131 OVERLAND, in script on an upward diagonal slant, the final letter ending in a flourish which underscores the word—pneumatic tires. The Willys-Overland Co., Toledo, Ohio.

169,139 EXPANSO, the first and last letters being very large capitals, the intervening ones small—cup packings formed of vulcanized fabrics. Montpelier Manufacturing Co., Montpelier, Indiana.

169,141 "WESTERN GIANT"—pneumatic tires of rubber or fabric and rubber, and inner tubes. The India Tire & Rubber Co., Akron and Mogadore, Ohio.

169,148 Representation of a bird flying, and under it the words: BLUE BIRD; within the double lines of a diamond-shaped border surrounding these the words: NEW YORK RUBBER COMPANY, NEW YORK—rubber hose and belting. New York Rubber Co., New York, N. Y.

169,179 Broad outline of a double-headed arrow, conventionalized—rubber tires and tubes. Hood Rubber Co., Watertown, Mass.

169,193 An ornamental signboard against lines, top and bottom, suggesting a wall; within a circular white space on the top half of the signboard the words: WEAR-EVER PATCHES; the lower half of the signboard contains a larger white space, oblong in shape and blank—patches for automobile tubes. The Wear-Ever Patch Manufacturing Co., Inc., Columbus, Ohio.

169,194 INTEGRAL, in outline letters—pneumatic tubes. North American Process Co., Inc., Malone, N. Y.

169,225 The word: BUDDIES, and beneath it in smaller type the words: ARE GOOD SOLES—slabs and sheets of rubber composition particularly for shoe soles. John E. Cable, doing business as Edison Rubber Co., Akron, Ohio.

169,247 SANITEX—waterproof fabrics. Archer Strauss Rubber Co., Framingham, Mass.

169,271 KENLIT, the top line of the letters conforming to the angle formed by the top lines of the diamond-shaped border, and underneath this the words in script: "ITS WATERPROOF"—textile fabric sheeting coated with a composition containing nitrocellulose, and rubber-coated cloth. Kenlit Manufacturing Co., Medford, Mass.

169,274 FEDERAL, the top stroke of the F extending over the remaining letters—tires, reliners, outside tire sleeves, repair patches, packing, rim filler, strips, inner tubes, inside tire sleeves, repair fabrics, hose and tubing, belts and belting, brake lining, valve bases, flaps, and transmission disks, all made wholly or partly of rubber. The Federal Rubber Co., Cudahy, Wis.

169,275 On a triangular banner flying from the end of a flagstaff the word: FEDERAL, the letters graded in size to fit the triangle—description of goods same as for No. 169,274. The Federal Rubber Co., Cudahy, Wis.

169,276 FEDERAL, in large letters all one size—same description as for No. 169,274. The Federal Rubber Co., Cudahy, Wis.

169,302 ROVER, slightly curved in outline—tires of rubber and rubber and fabric, inner tubes, tire casings and shoes, and repair parts for use in connection with same. The Ideal Tire & Rubber Co., Cleveland, Ohio.

169,306 The words: KELLY-SPRINGFIELD AIRCORE in fanciful arrangement—tires made wholly or partly of rubber. Kelly-Springfield Tire Co., New York, N. Y.

169,375 RAJAH, the central J extending conspicuously above and below the line of the other letters—rubber heels and soles, rubbers, overshoes, and rubber shoes. Alfred Hale Rubber Co., Atlantic, Mass.

169,382 INVINCIBLE—soles, half soles and heels of rubber or composition. Bailey Rubber Heel Co., Inc., Beverly, Mass.

Act of March 19, 1920, Section 1 (b)

169,411 NO-TEAR—rubber boots and shoes. Goodyear Rubber Co., New York, N. Y., and St. Paul, Minn.

169,412 DR. LEONARD'S "EASY STEPPER"—boots, shoes, slippers and sandals made of leather, rubber, canvas and other fabrics, and combinations thereof. B. Friedman, New York, N. Y.

169,421 Within a double-ruled rectangular border the words: FOOT-GRIP, in script. Hochschild, Kohn & Co., Baltimore, Md.

Granted June 19, 1923, Act of February 20, 1905

169,476 AVONA—hot water bottles, hot water bags and syringes. Jordan Marsh Co., Boston, Mass.

169,494 DE LUXE—garters and arm bands. Sturm and Scheinberg, New York, N. Y.

169,514 The words: BE WELL HEELED—rubber heels. The Taunton Rubber Co., Taunton, Mass.

169,522 On a scroll background the word "FLEXILE—boots and shoes made wholly or partly of leather, rubber, fabrics, and combinations of same. Edwin Clapp & Son, Inc., East Weymouth, Mass.

Act of March 19, 1920, Section 1 (b)

169,563 INER-GUARD, against a background representing a tire in outline and with arrows on either side pointing to a black section supposedly representing the inner tube—inner tubes. Iner-Guard Tube & Rubber Co., St. Louis, Mo.

169,574 "KEEPDRY," with letters slightly curved—raincoats. New Process Co., Warren, Pa.

Granted June 26, 1923, Act of March 19, 1920 Section 1 (b)

169,723 GRIPPER, the two P's overlapping—blow-out patches for tires, and fan belts for automobile engines, brake linings, transmission linings, tube patch kits, and rim liners. Henry M. Levin, doing business as Rawhide Products Distributing Co., Kenilworth, N. J.

169,743 Within a double ruled parallelogram, at the top, the words: THE "81" TIRE STORES—rubber tires and inner tubes. The "81" Tire Stores, Birmingham, Ala.

The Dominion of Canada

Registered

33,344 Medallion bearing the word: INDIA, and under this appears the word: INDIA—tires of rubber or rubber and fabric, inner tubes, tire repair materials and accessories. The India Tire & Rubber Co., Akron, Ohio, U. S. A.

33,347 The word: FIBREGUM—roofing materials, surfacing materials, tar and rubber compounds, paint preservatives and coating materials for building and surfacing purposes. Alexander Murray & Co., Ltd., Montreal, Quebec.

33,348 LIQUIGUM—description same as for 33,347. Alexander Murray Co., Ltd., Montreal, Quebec.

33,369 KRO-FLITE—golf balls and golf clubs. A. G. Spaulding Brothers of Canada, Ltd., Toronto, Ont.

33,375 BLACK CHIEF—rubber boots and shoes. Gutta Percha & Rubber, Ltd., Toronto, Ont.

33,439 RADION—hard rubber ebonite and vulcanite sheets, rods, tubes, molding, and parts of radio apparatus and other electrical equipment and apparatus—American Hard Rubber Co., New York, N. Y., U. S. A.

33,446 The word PARAFLOR arranged within a border of approximately lozenge shape, from which the angles on either side have been cut off; the border bears the words: THE NORTH BRITISH RUBBER COMPANY, LIMITED, CASTLE MILLS, EDINBURGH; underneath the word PARAFLOR are the words: RUBBER CARPETING, and contained within a circle the representation of a pair of scales supported by a dagger—coverings in the nature of floor cloth, made partly or entirely of india rubber or like material. The North British Rubber Co., Ltd., Castle Mills, Fountainbridge, Edinburgh, Scotland.

33,467 The words: GENDRON and PENETANG in lozenge form—light and heavy rubber footwear and leather-topped rubber footwear. The Gendron Rubber Co., Penetanguishene, Ont.

The United Kingdom

Published May 30, 1923

431,175 Representation of a man pulling a strip of adhesive tape from a roll, merely the hands holding the roll and one shoulder, the face, and front part of the cap worn by the man being shown—all goods included in Class 40. Vorwerk & Sohn, 34 Kleiner Werth, Barmen, Germany.

432,782 EFELANT—goods of india rubber or gutta percha not included in classes other than Class 40, but not including elastic gusset webs or electric wires covered with india rubber, or similar goods. Badham Adolphus Thornhill, Single Tree, Newera Elija, Ceylon, and 30 Glennie street, Colombo, Ceylon.

434,132 TYKE—India rubber soles and heels for boots and shoes. Russells (Manchester) Ltd., Lands End Works, Rhodes, Manchester, Lancashire.

435,945 SEMANCO—goods of rubber or gutta percha in Class 40, but not in other classes and not including inner tubes, pneumatic tires for automobiles or motorcycles, or goods similar to these. Charles Macintosh & Co., Ltd., 2 Cambridge street, Manchester.

434,738 Representation of a stag standing in the foreground of a landscape; the whole enclosed in a circle—rubber goods in Class 40 not included in other classes. The Rubber Coy. of Scotland, Ltd., Forthvale Works, Cornton Road, Sterling, Scotland.

B434,814 "Scottish Champion," in script, the words forming a slight curve—sporting goods including golf balls. Lumley's Limited, 80 and 82 Sauchiehall street, Glasgow, Scotland.

Published June 6, 1923

432,783 PURUB—rubber soles and heels for footwear. Badham Adolphus Thornhill, 30 Glennie street, Colombo, Ceylon.

434,265 TREOTEX—elastic webbing. Treo Co., Inc., Jamaica, New York, N. Y.

434,815 Within a circle the word: SUPERFLITE; beneath this the letters N and B, interlocking; in the border surrounding the whole the words: NORTH BRITISH—golf balls. The North British Rubber Co., Ltd., Castle Mills, Fountainbridge, Edinburgh, Scotland.

436,041 RESISTON—electric insulating substances, not included in other classes. American Hard Rubber Co., New York, N. Y., U. S. A.

Published June 13, 1923

429,430 Conventionalized representation of a star and under it the word: "STAR"—bookbinding materials, pencils, rubber erasers, crayons, etc., included in Class 39, but not including paper and paper boards or like materials. Firm trading as Joseph Max Illfelder, Schwabacherstrasser, 52 Furth, Bavaria, Germany.

434,345 SPARTAN—rubber soles, heels, and tips for boots and shoes. William John Ainsworth, trading as The Safety Rubber Co., 29 Regent Circus, Swindon, Wiltshire.

435,606 BOSCALACE—laces for shoes and like footwear, composed of rubber and textile thread, the rubber predominating. John Faulkner, The Orchard, Condamine street, Manly, Sydney, New South Wales. Address for service in the United Kingdom, in care of Lloyd Wise & Co., 10 New Court, Lincoln's Inn, London, W. C. 2.

435,750 TUXO—rubber mats, included in Class 40. Tuck & Co., Ltd., 63 St. Mary Axe, London, E. C. 3.

436,193 MOHAWK—rubber heels, pads and soles for boots and shoes. Padmore & Barnes, Ltd., Moccasin Works, St. James Road and Sharman street, Clayton, Manchester, Lancashire.

Published June 20, 1923

434,069 Representation of two kittens seated beneath an umbrella—rubber goods in Class 40. Katz Brothers, Limited, ½ Pepys street, Seething lane, London, E. C. 3, and 8 to 15 Raffles Place, Singapore, Straits Settlements.

436,200 On a square black background a white circle, within which the letters TUX are interlocked—rubber mats included in Class 40. Tuck & Co., Ltd., 63 St. Mary Axe, London, E. C. 3.

436,456 Princess—elastic cords, braids, webs and threads, included in Class 40. Walter Chapman, 69 Princess Road, Leicester.

Designs

The United States

Issued* May 22, 1923

62,432 Tire. Term 3½ years. Benjamin F. Worrell, Chicago, Illinois.

Issued* June 12, 1923

62,487 Tire. Term 3½ years. Robert H. Keaton, San Francisco, California.

62,510 Tire tread. Term 3½ years. Ramford G. Taylor, Seattle, Washington.

62,519 Tire tread. Term 3½ years. Arthur M. Elliott, Oakland, California.

Issued* June 19, 1923

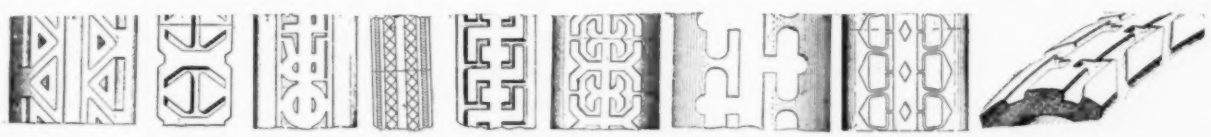
62,532 Tire. Term 14 years. William A. Brubaker, assignor to the Lyon Rubber Co., Inc., both of Akron, Ohio.

62,536 Tire. Term 14 years. Robert Iredell, assignor to The General Tire & Rubber Co., both of Akron, Ohio.

62,537 Tire tread. Term 14 years. Harold D. Reichard, Akron, Ohio.

Issued* June 26, 1923

62,563 Tire tread. Term 3½ years. William D. Carnal, Akron, Ohio, assignor to Western Tire Co., Omaha, Nebraska, a co-partnership.



62,432 62,487 62,510 62,519 62,532 62,536 62,537 62,563 62,593

62,591 Heel cushion for boots and shoes. Term 14 years. Benjamin Ross, Brooklyn, N. Y.

62,593 Tire. Term 14 years. John Tenney, Jr., Plainfield, assignor to Howe Rubber Co., New Brunswick, both in New Jersey.

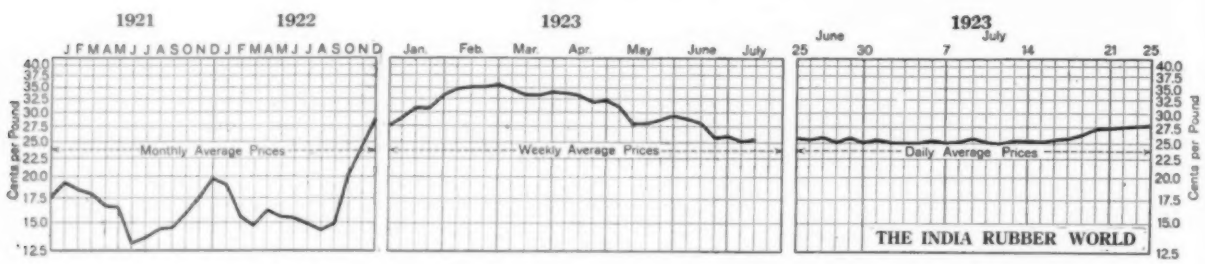
*Under Rule No. 167 of the United States Patent Office, the issue closes weekly on Thursday, and the patents of that issue bear date as of the fourth Tuesday thereafter.

The Dominion of Canada

Registered

5,798 Bulb or pump for operating motor horns. Russel Sutherland Smart, Ottawa, Ontario.

5,819 Tire tread, issued May 6, 1923. V. D. L. Rubber Corp., Ltd., Toronto, Ontario.



Ratio Graph of New York Market Fluctuations—Average Prices of Spot Ribbed Smoked Sheets

Review of the Crude Rubber Market

New York

THE generally downward trend in plantation spot rubber that began about the first of March, when the price was slightly above 35 cents, carried the price to 25 cents a month ago. The market held around that level for the first three weeks of July; at the end of that time an active buying interest developed which advanced the market sharply, nearly three cents in three days, reflecting similar London conditions.

Early in July spot price was 25 cents; sales were moderate in volume to the smaller consumers. More or less interest developed in October-December position, which was generally true throughout the early part of July.

Following the holiday and throughout the second week of the month buying continued routine. Buyers were numerous but sellers were few. The week closed with spot quoted at 25⅛ cents, with buyers and sellers deadlocked in the matter of transactions.

The third week opened with the prices firmer and good buying interest but no important sales. About the middle of the week buying interest was influenced by the firmness of London cables of heavy American buying in that market; trading, however, was restricted and all positions advanced. Spot quotations rose in the last three days of the week in sharp advances of practically one cent a pound a day, the week closing quotation being 27¾ cents as against 24⅞ cents one month previously.

Tire manufacturers are probably well stocked with rubber for current needs of restricted seasonal production and their buying interest is directed chiefly to futures during the last quarter year.

Parás and all other grades ruled in sympathy with plantations and without development of consumers' buying interest.

Imports of all grades during June, 1923, were 32,934 tons, compared with 15,750 tons one year ago. Plantation arrivals for June, 1923, were 31,574 tons, compared with 14,851 tons one year ago. Total importations of all grades for the six months ended June 30 were 190,039½ tons, compared with 130,358 tons for the corresponding period of last year.

Spot and future quotations on standard plantation and Brazilian grades were as follows:

PLANTATIONS July 2. Spot first latex crêpe, 24⅝-24¾ cents; August, 24¾-24⅞ cents; Aug.-Sept. 25-25¼ cents; Oct.-Dec., 26⅝-26¾ cents; Jan.-Mar., 27¼-27⅜ cents. July 25. Spot first latex crêpe, 27½-27⅝ cents; August, 27⅝-27¾ cents; Aug.-Sept., 27¾-27⅞ cents; Oct.-Dec., 28½-28⅝ cents; Jan.-Mar., 29½-30 cents.

July 2. Spot ribbed smoked sheets, 24⅜-24¾ cents; August, 24¾-24⅞ cents; Aug.-Sept., 25-25¼ cents; Oct.-Dec., 26⅝-26¾ cents; Jan.-Mar., 27¼-27⅜ cents. July 25. Spot ribbed smoked sheets, 27½-27⅝ cents; August, 27⅝-27¾ cents; Aug.-Sept., 27¾-27⅞ cents; Oct.-Dec., 28½-28⅝ cents; Jan.-Mar., 29½-30 cents.

July 2. Spot No. 1 amber crêpe, 24¼-24⅜ cents; August, 24⅜-24½ cents; Aug.-Sept., 24½-24⅝ cents; Oct.-Dec., 25¾-26 cents; Jan.-Mar., 26¼-26½ cents. July 25. Spot No. 1 amber crêpe, 27⅛ cents; August, 27¼ cents; Aug.-Sept., 27⅜ cents; Oct.-Dec., 29 cents.

July 2. Spot No. 1 rolled brown crêpe, 23½-23¾ cents; August, 23¾-24 cents; Aug.-Sept., 24¼-24½ cents; Oct.-Dec., 24¾-25 cents. July 25. Spot No. 1 rolled brown crêpe, 25½-25¾ cents; August, 25⅝-25⅞ cents; Aug.-Sept., 25¾ cents; Oct.-Dec., 26 cents.

SOUTH AMERICAN PARAS AND CAUCHO, July 2. Spot, upriver fine, 26½-26¾ cents; islands fine, 25-25¼ cents; upriver coarse, 23-23¼ cents; Cametá, 13¼-13½ cents; caucho ball, 24½-25 cents. July 25. Spot, upriver fine, 26¼-26½ cents; islands fine, 24¼-24½ cents; upriver coarse, 23¼ cents; Cametá, 13¼ cents; caucho ball, 23-24 cents.

London

The London market opened weak the first of July, ribbed smoked sheets selling then at 13⅝ pence. The market held firm with persistent rising tendency as the month advanced, with trading moderately active or occasionally dull from lack of consumers' interest. The third week of the month closed with good demand from consumers and improved business at 14¾ pence a pound.

Reported London stocks have shown a steady decline the past month as follows: June 26, 51,090 tons; July 3, 50,766 tons; July 10, 50,334 tons, and July 17, 49,976 tons.

The course of the London market was essentially a duplicate of that in New York and largely reflected American rubber buyers' sentiment.

It is reported that the standard export of plantation grades under the Stevenson restriction plan will be reduced from 65 per cent to 60 per cent for the next quarter. Also that Borneo has followed the policy of the other British colonies of Malaya and Ceylon and announced a restriction of exports of plantation rubber.

New York Quotations

Following are the New York spot quotations per pound, for one year, one month ago, and July 25, the current date:

Plantation Hevea

	July 25, 1922	June 25, 1923	July 25, 1923
LATEX			
Rubber latex (Hevea)..	@	$1.25@$1.30	*gal.* $1.25@1.30
CREPE			
First latex	.14¾@	.26 @	.28 @.28½
Off latex	.14½@.14½	.25¾@	.27¾@.27⅞
Amber No. 1.....	.14½@.15	.25⅛@	.27⅛@.27¼
Amber No. 2.....	.14¼@.14¾	.24¾@	.26¾@.27
Amber No. 3.....	.14 @.14½	.24⅛@	.26¼@.26½
Brown, clean, thin.....	.14 @	.24½@	.26¼@.26½
Brown, specky	.13¼@.13½	.24¼@	.25¾@.26
Brown, rolled	.11½@.12	.24 @	.26 @.26½

Crude Rubber Market—*Continued*

SHEET	July 25, 1922	June 25, 1923	July 25, 1923
Smoked, ribbed	.14¾@	.26 @	.27¾@.28¼
Smoked, plain	.13½@	.25½@	.27 @.27½
Unsmoked	†.13 @	.25 @	†.26½@
SCRAP			
Colombo scrap No. 1	.12 @	@	†.25 @
Colombo scrap No. 2	.10½@	@	†.23 @
East Indian			
PONTIANAK			
Banjermassin	.07¼@	.07 @.08	.07 @.07½
Palembang	.08¾@	.08 @.10	.07¼@.07¾
Pressed block	.12 @	.12 @.13	.12½@.13
Sarawak	.06 @	.07 @.09	.06½@.07
South American			
PARAS			
Upriver, fine	.26 @	.27 @.27¼	.27¼@.27½
Upriver, fine	*.28 @	*.38½@	@
Upriver, medium	.17½@	.24 @	.24½@.24¾
Upriver, coarse	@	.23¾@.24	.23¾@.24
Upriver, coarse	*.13¼@	*.37 @	@
Islands, fine	.18 @	.25 @.25½	.25 @.25¼
Islands, medium	†.16 @	.23½@	.24 @
Islands, coarse	.09½@	.14 @	.14 @.14¼
Cametá	.09½@	.14 @	.14 @.14¼
Acre Bolivian, fine	.20¼@	.27 @	.27½@
Acre Bolivian, fine	*.28 @	*.39 @	@
Beni Bolivian	†.20¼@	.27½@.28	.27¾@
Madeira, fine	.23 @	.27 @	.27¾@.28
Peruvian, fine	.17¾@	.25½@.26	@
Tapajos, fine	.18 @	.26 @	.26¼@
CAUCHO			
Upper caucho ball	.13½@	.25 @	.24½@.24¾
Upper caucho ball	*.18½@	*.38 @	@
Lower caucho ball	.10½@.11½	.24 @	.24 @
Maniçobas			
Ceará negro heads	.10 @	.22 @	@
Ceará scrap	.05 @	.09 @	@
Maniçoba 30% guaranty	.09 @	.21 @	@
Mangaberia, thin sheet	.12 @	.22 @	@
Centrals			
Central scrap	.08 @.09	.17½@.18	.17 @.18
Central wet sheet	.06 @.08	.12 @.14	.10 @.12
Corinto scrap	.08 @.09	.17½@.18	.17 @.18
Esmeralda sausage	.08 @.09	.17½@.18	.17 @.18
Guayule washed & dried	.26 @	.28 @	.26 @
Africans			
Benguela, No. 1, 28½%	@	.18 @	†.18 @
Benguela, No. 2, 32½%	.05 @	.15 @	.15 @
Congo prime, black upper	.14 @	.23 @	.22 @.24
Congo prime, red upper	.12¾@	.22 @	.23 @
Kassai, black	.14 @	.23 @	.22 @.24
red	.10 @.12	.22 @	.23 @
Gutta Percha			
Gutta Siak	.14¾@	.16 @.18	.17½@.18
Red Macassar	2.75 @	3.00 @3.05	3.00 @
Balata			
Block, Ciudad Bolivar	.50 @.51	.63 @.66	.70 @.71
Colombia	.45 @	.52 @.54	.58 @.60
Panama	.44 @	.50 @.52	.58 @.60
Surinam, sheet	.70 @	.80 @.84	.74 @
amber	.73 @	.76 @.78	.76 @
Chicle			
Colombia	.50 @	.25 @	.25 @
Honduras	.70 @	.62 @	.62 @
Venezuela	.70 @	.63 @	.63 @
Yucatan, fine	.75 @	.65 @	.65 @

*Washed and dried crêpe. Shipment from Brazil.
†Nominal.

Comparative Low and High New York Spot Rubber Prices

	July 1923*	1922	1921
PLANTATIONS			
First latex crêpe	$0.24⅝@$0.28	$0.14½@$0.15¾	$0.14 @$0.17
Smoked sheet, ribbed	.24¾@ .27¾	.14½@ .15¾	.11½@ .15½
PARA			
Upriver, fine	.26¼@ .26¾	.18 @ .20	.15½@ .17½
Upriver, coarse	.22¾@ .23½	.12¼@ .14	.07½@ .09
Islands, fine	.24½@ .25¼	.16⅞@ .17¼	.16 @ .17
Islands, coarse	....	.08 @ .09½	.07 @ .09
Cametá	.13 @ .13½	.08 @ .09¼	.07½@ .08½

*Figured to July 25, 1923.

Reclaimed Rubber

The renewed demand for reclaimed which began in marked volume about seven months ago has suffered seasonal reduction due to lessened activity in most manufacturing lines of the industry. Continuance of the present tendency of crude rubber to advance will enhance the demand for reclaimed rubber grades and will doubtless lead to stronger prices.

The Consolidated Classifications Committee held hearings at Chicago, beginning July 10, on a proposed change of carload ratings on reclaimed rubber from fifth class to sixth class basis in the official classification territory.

Current quotations are nominal. At present levels standard grades can be bought to yield abnormally low volume costs.

New York Quotations

July 25, 1923.

Prices subject to change without notice

Reclaimed Stocks

FRICTION	Per Pound
Compounded, lb.	$0.18 @$0.19
Pure gum friction, lb.	.21½@ .22½
TUBE	
Compounded, lb.	.12½@ .13
Floating, lb.	.15½@ .16
AUTO TIRE	
Black, lb.	.09¼@ .09¾
Gray, lb.	.11 @ .11¼
White, lb.	.13¼@ .13½
Black, washed, lb.	.11 @ .11¼
SHOE	
Unwashed, lb.	.10½@ .11
Washed, lb.	.13¼@ .13½
MECHANICAL, lb.	.10 @ .11
TRUCK TIRE, lb.	.08½@ .09
High Grade Red, lb.	.13½@ .14

New York Average Spot Rubber Prices

PRICES IN CENTS PER POUND

	June, 1923																		July, 1923					
	11	12	13	14	15	16	18	19	20	21	22	23	25	26	27	28	29	30	2	3	4*	5	6	7
PLANTATIONS:																								
Sheet																								
Ribbed smoked	27½	27¼	27⅜	27¼	27⅛	27	26⅞	26¾	26⅜	25⅝	25¾	25⅞	25½	25	24⅞	25⅛	24¾	24⅞	24⅝	24⅜	....	24⅞	24¾	24¾
Crêpe																								
First latex	27⅝	27⅜	27½	27⅜	27¼	27⅛	27	27	26⅝	25⅞	26	26⅛	25⅝	25⅛	25	25¼	24⅞	25	24¾	24¾	....	25	24⅞	24⅞
Off latex	27	26⅞	26⅞	26¾	26⅝	26¾	26⅜	26⅜	26	25½	25	25⅜	25⅛	24⅜	24½	24⅜	24½	24⅜	24¼	24⅜	....	24⅜	24¼	24¼
No. 1 blanket	27	26⅞	27	26¾	26¾	26⅝	26½	26¼	25¾	25⅛	25½	25½	25¼	24¾	24⅜	24½	24½	24½	24½	24⅜	....	24⅜	24⅜	24⅜
No. 2 blanket	26½	26¼	26½	26¼	26⅛	26⅛	25⅞	25¾	25⅜	24⅝	25⅛	25¼	24¾	24¼	23⅞	24⅜	24	24⅛	23⅞	24	....	24	23⅞	23⅞
No. 3 blanket	26	25⅞	26⅛	25⅝	25⅝	25⅝	25⅜	25¼	24⅞	24⅛	24½	24⅞	24⅜	23⅞	23½	23¾	23⅝	23¾	23⅜	23⅝	....	23⅝	23½	23½
Thin, clean, brown	26¼	26¼	26⅜	26¼	26¼	26¼	25⅞	25¾	25¼	24⅝	24¾	25¼	25	24⅛	24	24⅛	24	24	23⅞	23⅞	....	23¾	23⅞	23⅞
Specky brown	25⅝	25⅜	25⅞	25⅞	25¾	25¾	25½	25	24¾	24⅛	24¼	24¾	24¼	23¾	23½	23¾	23½	23⅜	23½	23½	....	23⅜	23⅜	23⅜
Rolled brown	25¼	25	25¼	25⅛	25	25⅛	24⅞	24⅝	24½	23⅞	24¼	24¼	23⅞	23¾	23½	23½	23⅜	23¼	23¼	23¼	....	23¼	23¼	23¼

*Holiday.

The Market for Rubber Scrap

New York

The market for rubber scrap during the past month has been very quiet. Not much old business was transacted and new orders were difficult to get. Prices are low, dealers are marking time and figuring when the reclaimers will require replenishment of stocks. Reclaiming plants are in fairly active operation and improved fall business is anticipated. The outlook is influenced indirectly by the prospects of a rise in crude rubber prices, which have recently shown a tendency to advance sharply.

Boots and Shoes. Dealers' bids a month ago were around $2.75 a hundred. At the present time they rule about 10 cents less delivered, with the mills seeking somewhat lower figures on such business as they are offering.

Tires. Mixed tires are bid at $13 to $14, unchanged from a month ago. It is reported that they can hardly go lower and that all buying is on old orders. There is no call for solid tires.

Inner Tubes. Prices hold firm. Bids on No. 1 range $4.25 to $4.75 a hundred and on No. 2 and red from $3.00 to $3.25 a hundred, with very little business being transacted.

Hose. The market continues dull and prices nominal.

Mechanicals. There continues to be no market on this grade.

Quotations for Carload Lots Delivered

July 25, 1923

Prices subject to change without notice

Boots and Shoes		
Boots and shoes, black	lb.	$0.02¼@$0.03
Trimmed arctics	lb.	.02 @ .02¼
Untrimmed arctics	lb.	.01½@ .01¾
Hard Rubber		
Battery jars, black compound	lb.	.02 @ .02½
No. 1 scrap	lb.	.09 @ .10
Inner Tubes		
No. 1	lb.	.04¼@ .04¾
Compound red	lb.	.03 @ .03½
Mechanicals		
Black scrap, mixed	lb.	.01¾@
Heels	lb.	.00½@ .00¾
Horse-shoe pads	lb.	.02¾@ .03¾
Hose, air brake	lb.	.00¾@ .01
regular	lb.	.00½@ .00¾
Red, scrap, mixed	lb.	.01¾@ .02½
White scrap, mixed	lb.	.01¾@ .02½
Tires		
PNEUMATIC		
Auto peelings	lb.	.01½@ .01¾
Bicycle	lb.	.00¾@
Standard white auto	lb.	.01¾@ .01¾
Mixed auto	lb.	.00¾@
Stripped, unguaranteed	lb.	.00½@ .00¾
SOLID		
Carriage	lb.	.01¼@ .01½
Irony	lb.	.00½@ .00¾
Truck, clean	lb.	.01¼@ .01½

During January and March, 1923, Argentina has stood second on the list as purchaser of our automobile tires, being outstripped only by England. During February and April she ranked as third, with England, Mexico and New Zealand in the lead. Argentina's importations of these tires were valued as follows: January, $133,632; February, $131,282; March, $167,630; and April, $93,125.

British Malaya Rubber Exports

An official report from Singapore states that the gross exports of rubber from British Malaya in the month of June, 1923, amounted to 18,621 tons (41,712,400 pounds); the amount of rubber imported was 4,957 tons (11,105,000 pounds); so that net exports amounted to 13,664 tons, as compared with 17,330 tons in the corresponding month of 1922.

Appended are the comparative statistics of net exports:

	1922		1923	
	Gross Exports Tons	Net Exports Tons	Gross Exports Tons	Net Exports Tons
January	18,962	16,027	22,871	18,513
February	20,033	18,426	19,907	15,818
March	19,304	17,812	23,646	18,538
April	14,400	12,530	24,008	18,619
May	24,789	22,095	20,115	15,095
June	19,617	17,330	18,621	13,664
Totals	117,105	104,229	129,168	100,247

Plantation Rubber Exports from Malaya

	January 1 to May 31, 1923			January 1 to June 21, 1923
	Singapore Pounds	Malacca Pounds	Penang Pounds	Port Swettenham Pounds
To United Kingdom	3,951,600	4,047,800	2,983,600	1,766,114
The Continent	7,458,500	2,391,600	2,553,200	44,800
Japan	11,102,200	710,100	134,400	.....
United States	122,819,200	15,733,900	29,023,800	685,826
British Possessions	1,293,300	3,200	718,900	77,675
Other countries	123,400	.....	100	.....
Totals	146,748,200	22,886,600	35,414,000	2,574,415

U. S. COTTON STANDARDS ACT

Regulations have been issued by the Department of Agriculture regarding the enforcement of the United States Cotton Standards Act which becomes operative August 1. The act contains only one mandatory provision, which requires that American cotton shall be sold only on the official United States standards except when a sale is negotiated by sample or on the basis of a private type which is used in good faith and not to evade the official standards or substitutions for them.

The regulations to be issued by the Secretary of Agriculture under the Cotton Standards Act contemplate three distinct services: (1) An informal classification of samples; (2) The classification of agreed samples submitted by two parties involved in a dispute; and (3) The classification of samples, the authenticity of which is established by supervision of the storage and sampling.

EXPORTS OF AMERICAN MECHANICAL RUBBER GOODS INCREASING

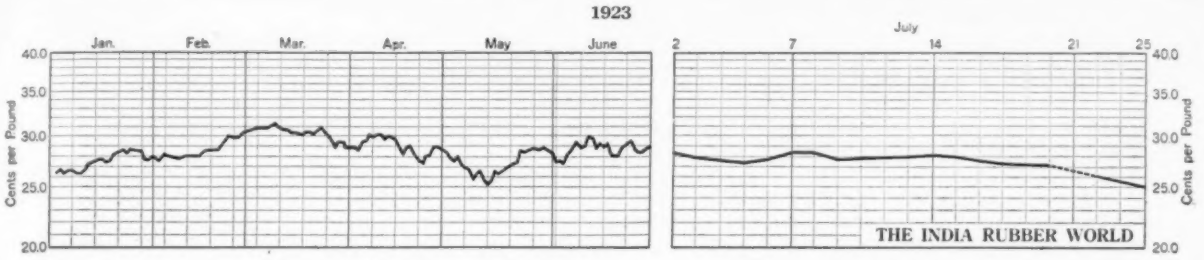
It is interesting to note the development during the present year of our export trade in mechanical rubber goods. During the first three months only of 1923 these exports rose to a value of $1,009,527, as compared with $3,154,627, the total for the entire calendar year 1922. Figures for the three months are as follows:

	1922	1923
January	$182,146	$322,007
February	196,651	277,916
March	238,146	409,604
	$616,943	$1,009,527

This revival of export trade, which began during the last months of 1922, is of particular interest in view of the fact of the decline following the abnormal sales of 1920.

Combined Exports of Belting, Hose and Packing

Fiscal year, 1912-1913	$2,605,551	Fiscal year, 1917-1918	$4,578,396
Fiscal year, 1913-1914	2,372,887	Calendar year, 1918	4,525,243
Fiscal year, 1914-1915	1,807,848	Calendar year, 1919	6,100,460
Fiscal year, 1915-1916	2,986,953	Calendar year, 1920	8,398,401
Fiscal year, 1916-1917	3,532,384	Calendar year, 1921	4,106,937
		Calendar year, 1922	3,154,627



Ratio Graph of New York Market Fluctuations—Daily Prices of Spot Middling Upland Cotton

The Market for Cotton and Other Fabrics

New York

AMERICAN COTTON. The ratio graph of New York market quotations printed above shows the daily fluctuations of middling spot cotton continuously since the beginning of this year. At that time the price was 26.45 cents, from which point a strong upward tendency urged the price generally upward to the highest so far this year—31.25 cents on March 19. Powerful influences including a poor start, short crop prospects, and liquidation forced the market downward in violent reactionary drops to the low of 25.30 cents on May 12. A month later the reaction had carried the price to 29.90 cents, June 12. The seasonal decline in tire manufacturing and slower movement of cotton goods in July brought about fluctuations in price, mostly downward, at the time of opening of the new quarters of the New York Cotton Exchange, when the market was steady a few days at 27.35 cents. Continued dullness resulted in further weakness, quotations being 24.65 cents July 25.

EGYPTIAN COTTON. Stapled cottons on the average show a slight decline from the mid-June level. Uppers were off about two cents, but Sakel only about one cent. The new crop prospects in Egypt are very good thus far and the effect of the increased acreage in uppers will undoubtedly be felt later on. Meanwhile, Sakel for prompt shipment is apparently on a very attractive basis. Quotations on medium grade uppers for shipment were 33 cents and medium grade Sakel 32½ cents.

SEA ISLAND. The demand for this cotton staple is extremely small and the supply is very limited. Extra choice can be bought on a basis of about 38 cents.

ARIZONA COTTON. The new Arizona crop is doing nicely, but even with perfect conditions it does not seem possible that more than 30,000 bales of Pima will be produced this year. There is still a fair amount of old crop Pima available on a basis of about 35 cents for No. 2.

Cotton Fabrics

DUCKS, DRILLS AND OSNABURGS. The cloth market is in a severe slump, based more on fear of cotton price depreciation than on absence of immediate future need for goods on the part of the buyers. The first definite assurance of the size of the growing crop will doubtless see active trading resumed on one price basis or another and result in a normally active season through the autumn and late winter months. Many fabrics are selling below cost of production based on present spot cotton and as a matter of fact fabrics have been recently priced at less than they could be produced. Production of cotton goods in general is proceeding at about 75 per cent of normal.

RAINCOAT FABRICS. The raincoat trade has been absolutely at a standstill during the past month and prices quoted are merely nominal, due to absence of buying interest.

SHEETINGS. The market for sheetings has ruled exceptionally dull, the demand in practically every consuming channel being greatly restricted and cotton mills generally closed for a vacation period or operating on a seasonal or subnormal basis.

TIRE FABRICS. Early in the month the trade features were small orders only with deferred deliveries requested from tire manufacturers on all sides. This situation led some fabric mills to stop manufacturing operations until active interest in supplies is manifested by consumers. Other mills have put a percentage of their looms in storage and the next season will open with a reduction in fabric manufacturing equipment. Trade is not only seasonally slack but virtually flat.

New York Quotations

July 25, 1923
Prices subject to change without notice

Burlaps

40—7½-ounce	100 yds.	$5.10	@$5.15
40—8-ounce		5.15	@
40—10-ounce		6.75	@ 6.80
40—10½-ounce		6.80	@

Drills

38-inch 2.00-yard	yard	.21½	@
40-inch 3.47-yard		.13	@
52-inch 1.90-yard		.25⅞	@
60-inch 1.52-yard		.32¼	@

Duck

CARRIAGE CLOTH

38-inch 2.00-yard	yard	.24	@
40-inch 1.47-yard		.32	@
72-inch 16.66-ounce		.53	@
72-inch 17.21-ounce		.57	@

MECHANICAL

Hose	pound	.45	@
Belting		.44	@

TENNIS

51-inch 1.35-yard	yard	.39	@

Osnaburgs

40-inch 2.35-yard	yard	.20⅞	@
40-inch 2.48-yard		.19⅞	@
40-inch 3.00-yard		.16¾	@
37½-inch 2.42-yard		.20¼	@

Raincoat Fabrics

COTTON

Bombazine 64 x 60	yard	$0.15	@
Bombazine 60 x 48		.13	@
Cashmeres, cotton and wool, 36-inch, tan		.55	@
Plaids 60 x 48		.14½	@
Plaids 56 x 44		.13¾	@
Surface prints 60 x 48		.15¼	@
Surface prints 64 x 60		.16¼	@

Sheetings, 40-inch

48 x 48, 2.50-yard	yard	.16	@	.16¼
48 x 48, 2.85-yard		.13½	@	.13¾
64 x 68, 3.15-yard		.14¾	@	
56 x 60, 3.60-yard		.12¼	@	.12½
48 x 44, 3.75-yard		.10¾	@	.11
44 x 44, 5.50-yard		.08½	@	.08¾

Sheetings, 36-inch

48 x 48, 5.00-yard	yard	.08	@	.08¼
44 x 40, 6.00-yard		.07	@	.07¼
40 x 40, 6.25-yard		.07	@	

Silks

Canton, 38-inch	yard	$0.37½	@
Schappe, 35-inch			@

Tire Fabrics

BUILDING

17¼-ounce Sakellaridis, combed	pound	.80	@
17¼-ounce Egyptian, combed		.68	@
17¼-ounce Egyptian, carded		.62	@
17¼-ounce Peeler, carded		.56	@

CORD

15-ounce Egyptian, combed	pound	.70	@
15-ounce Egyptian, carded		.63	@
2½-pick Peeler, carded		.57	@

BREAKER

Leno, Peeler, carded		.56	@

CHAFER

9¼-ounce Egyptian, carded	pound	.70	@
9¼-ounce Peeler, carded		.62	@

Prices of Raw Cotton and Cotton Fabrics for the First Six Months of 1923

RAW COTTON

	Jan. 2	Jan. 9	Jan. 15	Jan. 23	Feb. 1	Feb. 6	Feb. 14	Feb. 27	Mar. 7	Mar. 17	Mar. 26	Apr. 2	Apr. 9	Apr. 16	Apr. 21	May 1	May 11	May 19	May 29	June 11	June 20	June 23	June 30	July 12
Spot Cotton	26.45	26.60	27.75	28.75	27.40	28.65	28.05	30.15	31.20	31.30	28.75	28.55	30.00	28.25	27.30	27.50	25.30	27.15	28.90	29.90	27.65	29.10	28.25	27.85
New Bedford 1 3-16	32½-33	33½-34½	33½-34½	33¾-35	34-35	33½-34½	34-35	34½-35½	35-36	35½-36½	35-36	34½-35½	34½-35½	35-36	32½-33½	33-34	32-33½	31-32	32-33½	32½-33¼	31½-32½	32½-33¼	31½-33	31½-33

DRILLS

	Jan. 2	Jan. 9	Jan. 15	Jan. 25	Feb. 1	Feb. 6	Feb. 14	Feb. 27	Mar. 7	Mar. 17	Mar. 24	Apr. 2	Apr. 9	Apr. 16	Apr. 21	May 1	May 11	May 19	May 29	June 9	June 16	June 23	June 30	July 14
37-inch 3.95	12¾	12¾	13	13	13	13⅛	13⅛	13¼	13¼	13¼	13⅛	13	12⅞	12¾	12½	12⅜	12	11½	11¼	11	11	11	10¾	10½
37-inch 3.50	14	14	14½	14¼	14¼	14⅜	14½	14⅝	14½	14⅜	14⅜	14½	14½	14¼	14⅜	14	13¾	13½	12½	12½	12½	12½	12¼	12
37-inch 3.00	15	15	15½	15¾	15¾	15¾	15¾	16	16	16½	16½	16	16	16	15¾	15¾	15	14¾	14½	14¼	14¼	14¼	14	13¾
37-inch 2.75	16½	16⅜	16½	16¾	16¾	16¾	16¾-17	17	17	17¼	17½	17	17	16¾	16½	16	16	15¾	15½	15¼	15	15	14¾	14¾
34-inch 4.75	10½	10½	11	11	11	11	11	11¼	11¼	11¾	11¾	11⅝	11⅝	11	10½	10¾	9¾	9¼	9	8⅞	8⅞	8⅞	8½	8½
30-inch 5.25	10	10	10	10	10	10⅛	10⅛	10⅛	10⅛	10½	10¼	10⅛	10⅛	10¼	10¼	10	9¾	9	8½	8½	8½	8½	8½	8½
30-inch 4.00	12	12¼	12¼	12½	12¼	12½	12½	12½	....	13	13	12½	12½	12½	12½	12½	....	11½	11½	11¼	11¼	11¼	11¼	10¾

WIDE DRILLS

	Jan. 20	Feb. 1	Feb. 10	Feb. 21	Mar. 1	Mar. 14	Mar. 31	April 7			May 15	June 1	June 9	June 13
59-inch 1.85	30	30	30	30	29	30	29	29	..	..	27½	25½ Terms	25½ Terms	25½ Terms

DUCKS

	Jan. 2	Jan. 20	Feb. 1	Feb. 10	Feb. 21	Mar. 1	Mar. 15	Mar. 31	April 7	April 19	May 4	May 21	June 1	June 9	June 18	July 6
Single filling—8 oz. card basis	21-23	22-24	23-24½	23-24½	23½-25	23½-25	23½-25	23½-25	23½-25	23½-25	22½-24	21½-23	21½-23	21½-23	21½-23	21-23
Double filling—8 oz. card basis	23½-25	24½-26	24½-26½	24-26½	25-27	25-27	25-27	25-27	25-27	25-27	24-26	23½-25	23½-25	23½-25	23½-25	23½-25
Sail—per cent off list	35-40	35	35-32½	35-32½	30	30	30	30	30	30	32½-35	35-40	35-40	35-40	35-40	35-40
Army—per cent off list	35-37½	30-32½	32½-30	32½-30	30-27½	30	30	30-27½	30-27½	30-27½	30-32½	32½-35	32½-35	32½-35	32½-35	32½-37½
Wide—per cent off list	35-37½	35	35-32½	35-32½	30	30-32½	30-32½	30-32½	30-32½	30-32½	32½-40	35-45	35-45	35-45	35-45	40-50
Enameling—poundage	48-50	50-52	50-55	50-55	53-58	53-58	53-58	53-58	53-58	53-58	51-56	51-54	50-52	50-52	50-52	50-51
Shoe	55	55	55	55	55-58	55-58	55-58	55-58	55-58	55-58	55	53	51-53	51-53	50-52	50
Hose and belting	46-47	46-48	46-48	46-48	48	48	48	48	48-49	48-49	47-48	44	44	44	43½	42

OSNABURGS

	Jan. 2	Jan. 9	Jan. 15	Jan. 25	Feb. 1	Feb. 6	Feb. 14	Feb. 27	Mar. 7	Mar. 17	Mar. 24	Apr. 2	Apr. 9	Apr. 16	Apr. 21	May 1	May11	May 19	May 29	June 9	June 16	June 23	June 30
30-inch, 7-oz. P. W.	17½	17¾-18	18¼-18¾	18½-19	18½-19	18½-19	19¾-19	18¾-19	18¾-19	18¾-19	18½-19	18¼-18½	18-18½	18	18	17-17½	16¼-16½	16-16½	16½-17½	16½-17½	16½-17½	16½-17¼	16½-17
40-inch, 7-oz. P. W.	18½	18¼	19	19½-20	20	20	20	20	20	20	20	20	19¼	19¼	19	18½	18	18	17¾	17½	17½	17	17
36-inch, 3.90 clean	11⅜	11½	11¼	11½-11⅜	12	12	12	12	12	12	12	12	12	12	11¾	11-11½	10¾	10¾	10½	10¼	10-10¼	10-10¼	10-10¼
40-inch, 3.50 P. W.	12¼	....	12¾	13½-13½	13¼	13¼	13¼	13¼	13¼	13¼	13¼	13	12¾	12¾	12½	12-12½	11¼	11½	11½	11½	11¼	11¼	11¼

SILKS AND COTTONS

	Jan. 2	Jan. 12	Jan. 25	Feb. 1	Feb. 2	Feb. 21	Mar. 1	Mar. 13	Mar. 24	April 3	April 11	April 24	May 1	May 9	May 21	June 1	June 8	June 16	June 25	July 9	
35-inch, 88x52, 22-26 single Canton	21½	21¼	21½-22	21½	22	22½	22½	22½	22½	22¼	22¼	22¼	22¼	22¼	22¼	22	21½	21½	21½	20½	nom.
35-inch, 96x64, 22-26 single Canton	23-23½	24	24½-24	24½	24½	24½	25	25	25	25	25	25	24	23½	22½	22½	22	22-22½	22	21	nom.
34-inch, 80x56, Tussah	32	34S-32½C	35½S 34½-33C	37S 34½-33C	34-34½C	40S-33½ Late	40S-33½ Late	38S-34C	35	35S-34C	35S-34C	35S-33½C	33½	33	32	30	30	29½	29	29	

WIDE SATEENS

	Jan. 2	Jan. 11	Feb. 1	Feb. 12	Feb. 21	Mar. 1	Mar. 12	Mar. 24	April 3	April 11	April 23	May 8	May 21	June 1	June 25
53-inch 1.30	41	41-42	42	42	42½	42½-43	42½-43	43	42	..	42	41½	39	39	38
54-inch 1.05	50	51-52	51	52-53	53	52½-53	52½-53	53½	52½	51	51	50½	49½-50	49½-50	47-48

SHEETINGS

		Jan. 2	Jan. 9	Jan. 15	Jan. 25	Feb. 1	Feb. 8	Feb. 16	Feb. 26	Mar. 7	Mar. 17	Mar. 26	April 2	April 9	April 17	April 24	May 1	May 11	May 19	May 29	June 9	June 16	June 23	June 30	July 12
36-inch	48x40 5.50	8¾	8¾	8¾	9	8¾	8¾	9	9	9¼	9⅛	8⅞	8⅞	8⅞	8¾	8½	8⅜	8	8	8	7⅞	8	7⅞	7⅞	7⅝
36-inch	48x48 5.00	9¾	9¾	9⅞	10	9⅞	10	10	10	10⅛	10⅛	10	10	10	9⅞	9½	9¼	8¾	8¾	8⅝	8¾	8¾	8⅝	8⅜
36-inch	56x60 4.00	12	12¼	12¼	12½	12½	12⅝	12¾	12¾	12⅞	12⅞-13	12⅞	12¾	12¾	12½	12½	12½	12	11½	11⅜	11½	11½	11½	11¼	11
36-inch	64x68 3.50	14	14½	14¼	14¾	14¼	14¾	14¾	14½	15	15	15	14⅞	14⅞	14¾	14¾	14⅝	14	14	14	13¾	13¾	13¾	13¾	13⅜
36-inch	48x40 3.25	13½	13½	14	14½	14	14	14⅛	14½	14¼	14¼	14¼	14	14	14	14	13¾	13½	13¼	13	12¾	12¾	12¾	12¾	12½
40-inch	56x60 3.60	13½	13¾	13⅞	14½	14¼	14¼	14½	14½	14¾	14¾	14¾	14¾	14¾	14½	14¼	14	13¾ ·	13¾	13⅜	13¼	13¼	13	12¾	12½
40-inch	64x68 3.15	15½	15¾	15¾	16½	16½	16½	16½	16¾	16¾	16¾	16¾	16¼	16¼	16¼	16¼	16¼	16	16	16	15½	15½	15¼	15	14½
40-inch	48x48 2.85	15½	15¾	16	16¾	17	17	17	17	17½	17½	17¼	17	17	16½	16¼	16	15	14¾	14⅝	14½	14⅝	14½	14¼	13½
40-inch	44x44 5.50	9¾	9¾	9¾	10	10	10	10	10	10	10	10	10	10	9⅞	9⅝	9⅜	9¼	9	9	9	8¾	8¾	8¾	8½

TIRE FABRICS

	Jan. 2	Jan. 12	Jan. 25	Feb. 1	Feb. 21	Mar. 1	Mar. 10	Mar. 24	April 3	April 11	April 23	May 1	May 9	May 21	June 1	June 9	June 16	June 30
Carded Egyptian woven	62-67	63-67	65-69	57-60	64½-69	65-68	65½-68	65½-68	65½-68	65½-68	65-68	63-67	62-65	60-63	60-62	59-60	59-60	59-60
Carded Peeler woven	57½-62	67½-62	60-64	60-65	60-65	60-65	61¼-67	61½-67	61½-67	61-67	60-63	60-63	58-62	57-60	57-60	56-57	56-57	54-56
Combed Egyptian woven	69-73	69-73	69-74	71-74	69½-74	70-75	70-75	70-75	70-75	70-75	.....	.....	.....	.....	.....	.....	.....	.....
Carded Egyptian (uppers) cord	65-70	66-70	68-72	70-72½	67½-74	68-72	68½-72	68½-72	68½-72	68½-72	68-70	66-70	64-68	64-65	63-64	60-62	60-62	60-62
Carded Peeler cord	61¼-65	61¼-65	63-66	63-68	63¼-68	64-68	66-70	66-70	65-70	65-70	63-66	62-65	60-64	59-63	58½-62	57-59	57-59	55-58
Combed Egyptian cord	72-76	72-76	72-77	74-77	72½-78	73-78	73-78	73-78	73-78	73-78	72-75	71-74	68-72	68-70	68-69	65-67	65-67	65-67
Chafing Fabrics, carded	56-61	56-60	58-61	59-62	60-63	60-63	61½-64	61½-64	61½-64	61½-64	61-63	60-63	60-62	60-62	59-60	59-60	59-60	56-57
Leno Breaker	56-69	56-59	58-62	59-62	60-63	60-63	61½-64	61½-64	61½-64	61½-64	61-63	60-63	60-62	60-62	59-60	59-60	59-60	56-57

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The Market for Chemicals and Compounding Ingredients

New York

SUMMER dullness characterized business in most lines of rubber compounding ingredients, although the reduction in tire prices has stimulated the sale of low price fillers as substitutes notably for zinc oxide and gas black.

ANILINE. Prices have remained steady, with the market dull and weak.

ASBESTINE. Asbestine remains unchanged in price. Supplies are taken by the mechanical goods trade in steady routine volume. This filler is rather neglected by the tire trade.

BARYTES. Consumption of barytes in the manufacture of lithopone for the paint and rubber industries has reached record proportions so far this year. The market is firmer than usual.

BENZOL. This material is in good supply but the market holds quiet and steady.

BLANC FIXE. Conditions are essentially the same as in the case of barytes. Its superiority as a rubber stock filler over ordinary barytes deserves fuller recognition in general compounding.

CARBON BLACK. This material has become as essential as zinc oxide in the manufacture of tires, and demand practically exceeds the supply. Large consumers' contracts for their yearly supply leave only a small margin of production available for spot sales. This condition has led to the prospective investment of many millions in new plants in the natural gas producing sections of the southwest, and the development of new process blacks as substitutes.

CHINA CLAY. Consumers are finding this material an excellent substitute for higher priced wear resisting fillers. Its cheapness as well as its inherent compounding value is in its favor. Supplies are abundant and in active demand in all branches of the rubber industry.

DRY COLORS. Seasonal dullness has overtaken the dry colors trade in common with most others; the movement in most lines is routine.

LITHARGE. The price of a month ago was reduced ½ cent a pound early in July without marked response from consumers. This material is standard in the footwear and tire divisions of the rubber industry and thus has a fairly steady outlet in those lines.

LITHOPONE. Production of lithopone has been phenomenal this year and business continues good even on a routine basis.

SOLVENT NAPHTHA. Consumption runs in excess of the supply; the price is firm in consequence.

SUBLIMED LEAD. Essentially the same situation prevails with this material as with litharge. A reduction of ½ cent a pound became effective early in July.

TALC. Consumption of both imported and domestic grades runs into heavy tonnage because of its liberal use in every line of rubber work. Prices are steady.

WHITING. Trade is better than the normal demand at steady prices.

ZINC OXIDE. Producers have missed recently the heavy orders of earlier in the year. Tire manufacturers have temporarily either closed down or curtailed production in marked degree for the summer months.

New York Quotations

July 25, 1923

Accelerators, Inorganic			
Lead, carbonate	lb.	$0.09¼	@
Lead, red	lb.	10⅝	@
sublimed blue	lb.	.08¾	@
sublimed white	lb.	.08¾	@
Lime, flour	lb.	.02½	@
R. M. hydrated	ton	20.00	@
superfine	lb.	.02	@
Litharge, domestic	lb.	*.10½	@ .11½
imported	lb.	*.17	@
Magnesia, carbonate, light	lb.	.07¾	@ .09
calcined, light (bbls.)	lb.	.23	@ .24
calcined, ex. light (bbls.)	lb.	.45	@
calcined, md. light (bbls.)	lb.	.15	@
calcined, heavy (bbls.)	lb.	.05	@ .06
Orange mineral A.A.A.	lb.	.139/10	@
Sulzin, ton lots	lb.		@
less ton lots	lb.		@
Accelerators, Organic			
A-7	lb.	.75	@ .85
A-19	lb.	.85	@ .95
Accelemal	lb.	.35	@
Accelerene (f. o. b. English port)	lb.	13s.	@
Aldehyde ammonia crystals	lb.	.95	@
Aniline (f. o. b.) factory	lb.	.15¾	@ .17
sulphate	lb.	.33	@
Cryline	lb.	.60	@
Diphenyl diamino carbazol	lb.	.40	@
Diphenylguanidine	lb.	1.20	@
Ethylidene aniline	lb.	.70	@ .75
Excellerex	lb.	.45	@ .50
Formaldehyde aniline	lb.	.52½	@
H. R.	lb.	1.40	@ 1.50
Hexamethylene tetramine	lb.	.95	@ .97½
Lead oleate (bbls.)	lb.	.14½	@ .16
Methylene aniline	lb.	.35	@ .42
No. 999	lb.	.17	@
Paraldehyde	lb.	.17	@ .19
Para-nitros-dimethyl aniline	lb.	1.00	@
Paraphenylene diamine	lb.	1.45	@ 1.50
Quinodine	lb.	.65	@
Super-sulphur, No. 1	lb.	.50	@ .60
No. 2	lb.	.25	@ .30
Super-X	lb.	.30	@
Tetramethyl thiuramdisulphide	lb.	6.00	@
Thiocarbanilide	lb.	.26	@ .40
Triphenylguanidine	lb.	1.10	@
Vul-Ko-Cene	lb.	.35	@

*Nominal.

Acids			
Acetic 28% (bbls.)	cwt.	$3.38	@$3.63
glacial, 99%	cwt.	12.78	@13.03
Cresylic (97% straw color)	gal.	1.10	@ 1.15
(95 dark)	gal.	1.05	@ 1.10
Sulphuric, 66 degrees	ton	15.00	@16.00
Alkalies			
Caustic soda	cwt.	3.10	@
flake, 76% (factory)	cwt.	3.50	@
solid, 76% (factory)	cwt.	3.15	@
Colors			
BLACK			
Bone, powdered	lb.	.05½	@ .07½
Carbon black	lb.	.21	@
pressed	lb.	.19	@ .24
Drop	lb.	.07½	@ .10
Gritless black	lb.	.40	@
Ivory black	lb.	.15	@ .45
Lampblack	lb.	.12	@ .40
Micronex	lb.	.19	@ .24
Shawinigan	lb.	.17	@ .18
BLUE			
Cobalt	lb.	.21	@ .26
Gritless blue	lb.	3.50	@
Prussian	lb.	.55	@ .60
Ultramarine	lb.	.15	@ .35
BROWN			
Iron oxide	lb.	.04½	@ .05½
Sienna, Italian	lb.	.05¾	@ .06
Umber, Turkey	lb.	.05¾	@ .06¼
GREEN			
Chrome, light	lb.	.32	@ .34
medium	lb.	.35	@ .36
dark	lb.	.36	@ .45
commercial	lb.	.12	@
tile	lb.	.13	@ .15
Gritless green	lb.	3.50	@
Oxide of chromium	lb.	.39¼	@ .60
RED			
Antimony, crimson, T. K.	lb.	$0.48	@ .50
crimson, 15/17% free	lb.	.36	@ .45
crimson, R.M.P. No. 3	lb.	.50	@
crimson F	lb.	.35	@ .45
Antimony, golden, T. K.	lb.	.19	@ .23
golden R.M.P. No. 7	lb.	.21	@
golden, 15/17% free	lb.	.20	@
golden, No. 1	lb.	.30	@
golden, No. 2	lb.	.20	@
7-A	lb.	.35	@
Arsenic sulphide, red	lb.	.15	@ .16
Gritless red (four shades)	lb.	3.50	@
purple	lb.	2.50	@
Indian maroon, English	lb.	.08	@ .14
Iron oxide, reduced	lb.	.08	@ .12
pure bright	lb.	.12	@ .14
Maroon oxide	lb.	.08	@ .12
Red oxide	lb.	.03½	@ .04½
crimson	lb.	.06½	@
English	lb.	.12	@
Spanish	lb.	.03	@ .04
Oximony	lb.	.16	@
Para toner	lb.	1.00	@ 1.10
Toluidine toner	lb.	2.25	@ 3.00
Venetian	lb.	.03½	@ .05
Vermilion, American	lb.	.25	@ .30
English quicksilver	lb.	1.30	@ 1.35
WHITE			
Albalith	lb.	.06⅞	@ .07½
Aluminum bronze	lb.	.55	@ .60
Lithopone, domestic	lb.	.07	@ .07½
Azo	lb.	.07	@ .07½
Red Seal, imported	lb.	.06¾	@ .07
Zinc oxide:			
American Horse Head			
Special	lb.	.08½	@ .09
XX red	lb.	.07⅞	@ .08½
French process, Florence			
Green seal	lb.	.10½	@ .11¼
Red Seal	lb.	.09½	@ .10¼
White seal	lb.	.11⅞	@ .12¼
Snow white	lb.	.13½	@
Azo (factory):			
ZZZ (lead free)	lb.	.08	@ .08½
ZZ (—5% leaded)	lb.	.07¼	@ .07¾
Z (8.15% leaded)	lb.	.07¼	@ .07¾

Colors—*Continued*

YELLOW

Arsenic	lb.	$1.00	@
Chrome, light and med.	lb.	0.19	@ .20
Gritless yellow	lb.	3.50	@
India rubber	lb.	.87½	@
Ochre, domestic	lb.	.02½	@ .03
imported	lb.	.03½	@ .03¾

Compounding Ingredients

Aluminum flake (carloads)	ton	25.00	@29.00
filler	ton	23.00	@
hydrate, light	lb.	.19	@ .21
Ammonia carbonate	lb.	.09	@ .10½
Asbestine	ton	20.00	@ 25.00
Aluminum silicate	ton	22.50	@25.00
Barium, carbonate, precip.	ton	68.00	@75.00
dust	lb.	.05	@
Barytes, pure white C. L.	ton	23.90	@
off color	ton	20.00	@
uniform floated	ton	23.90	@
Basofor	lb.	.04¾	@
Blanc fixe	lb.	.04¼	@ .04½
Carrara filler (factory)	lb.	.01¾	@
Chalk, precip. extra light	lb.	.04¼	@ .05
heavy (f.o.b. factory)	lb.	.03¼	@ .04
China clay, Dixie	ton	22.00	@32.00
Blue ribbon (carloads)	ton	14.00	@
Blue Ridge	ton	20.00	@30.00
Super Dixie	lb.	.02½	@
Cotton flock, black	lb.	.12	@
light-colored	lb.	.13	@
white	lb.	.16	@ .20
Cotton linters clean mill-run	lb.	.06	@
Fossil flour (powdered)	ton	60.00	@
(bolted)	ton	60.00	@
Glue, high grade	lb.	.30	@ .40
medium	lb.	.20	@ .26
low grade	lb.	.16	@ .19
Graphite, flake	lb.	.06½	@ .12
amorphous	lb.	.05	@
Infusorial earth (powd.)	ton	60.00	@
(bolted)	ton	65.00	@
Lime (bolted)	lb.	.02	@
Mica, amber	lb.	.05	@
powdered	lb.	*.15	@
white	lb.	.06	@
Pumice stone, powdered	lb.	.03	@ .05
Rotten st., powd. (bbls.)	lb.	.02½	@ .04½
Soap bark, cut	lb.	.09	@ .10
Soapstone, powdered, gray	ton	12.00	@
Sodium bicarbonate (bbls.)	lb.	.02½	@
Starch, powd. corn (bags)	cwt.	3.22	@ 3.32
(bbls.)	cwt.	3.49	@ 3.59
Tale, soapstone	ton	20.00	@
Terra blanche	ton	25.00	@27.50

* Nominal.

Chemical Market—*Continued*

New York Quotations

July 25, 1923

Whiting, Alba	cwt.		@
chalk, L. H. B.	ton	$18.00	@25.00
commercial	cwt.	1.00	@ 1.25
English cliffstone	cwt.	1.75	@ 2.00
gilders (bolted)	cwt.	1.10	@
K. T.	ton		@
Perfection (carloads)	ton	22.00	@25.00
Quaker	ton	13.00	@15.00
Superfine, L. H. B.	ton	13.50	@22.50
W. T.	ton	20.00	@
York	ton	12.00	@
Wood pulp, XXX	ton	35.00	@
X (f. o. b. factory)	ton	25.00	@

Mineral Rubber

Genasco (factory)	ton	50.00	@52.00
Gilsonite	ton	65.00	@
Hard hydrocarbon	ton	33.00	@42.00
Liquid rubber	lb.	.15	@
Ohmlac Kapak, K-R	ton	50.00	@60.00
K-4	ton	175.00	@
Soft hydrocarbon	ton	30.00	@40.00
320/340 M. P. hydrocarbon	ton	45.00	@50.00
300/310 M. P. hydrocarbon	ton	40.00	@45.00
Pioneer, M. R., solid (fac.)	ton	42.00	@44.00
M. R. granular	ton	52.00	@54.00
Robertson, M. R., solid	ton	35.00	@75.00
M. R. granular (factory)	ton	54.50	@72.50
Rubrax (factory)	ton	60.00	@
Synpro, gran. M. R. (fac.)	ton	55.00	@

Oils

Avoilas compound	lb.	.13	@
Castor, No. 1, U. S. P.	lb.	.14¼	@ .15
No. 3, U. S. P.	lb.	.14¼	@ .14½
Corn	lb.	.10	@ .10½
Cotton	lb.	.11¾	@ .12
Cycline	gal.	.35	@ .38
Glycerine	lb.	.16	@ .16½
Linseed, raw	gal.	1.02	@ 1.05
Palm lagos	lb.	.07½	@ .09
Palm, niger	lb.	.07	@ .07¼
Peanut, crude	lb.	.10½	@ .10¾
refined	lb.	.12¾	@ .13
Petrolatum, standard	lb.	.06	@ .08
Petrolatum, sticky	lb.	.08	@ .10
Pine, steam distilled	gal.	.65	@
Rapeseed, refined	gal.	.82	@ .84
blown	gal.	.95	@ .97
Rosin	gal.	.48	@ .50
Synpro	gal.		@
Soya bean	lb.	.10½	@ .11
Tar	gal.	.25	@ .28
Woburn	lb.	.04½	@

Resins and Pitches

Tar, pine, retort	bbl.	$12.00	@12.50
kiln	bbl.	13.00	@13.50
Pitch, Burgundy	lb.	.05	@
coal tar	lb.	.01½	@
Fluxol hardwood	lb.	.02	@ .03
pine tar	lb.	.03	@
ponto	lb.	.08	@
Rosin, K (bbl.)	280 lbs.	6.65	@
strained (bbl.)	280 lbs.	6.50	@
Shellac, fine orange	lb.	*.90	@
substitute	gal.	2.00	@

Solvents

Acetone (98.99% drums [6.62 lbs. per gal.])	lb.	*.25	@
Benzol (90% drums [7.21 lbs. per gal.])	gal.		@
pure (drums)	gal.	.42	@ .45
Carbon bisulphide (dms. [10.81 lbs. per gal.])	lb.	.06	@ .07
tetrachloride (drums, [13.28 lbs. per gal.])	lb.	.09½	@ .10½
Motor gasoline (steel bbls.)	gal.	.21½	@
Naphtha, V. M. & P.	gal.	.20½	@
solvent (drums extra)	gal.	.26	@ .27
59@61	gal.	14.50	@
63@66	gal.	16.50	@
66@68	gal.	18.00	@
Cymene (factory)	gal.	1.50	@
Toluol, pure (7.21 lbs. per gal.)	gal.		@
Turpentine, spirits	gal.	.94	@
wood, steam distilled	gal.	.86	@

Substitutes

Black	lb.	.09	@ .14
Brown	lb.	.10	@ .15
White	lb.	.10	@ .16
Brown factice	lb.	.08	@ .14
White factice	lb.	.09	@ .15
T. K., various	lb.	.14	@ .18

Vulcanizing Ingredients

Black hypo, T. K., S. F.	lb.	.22	@
13% F. S., L. H. B.	lb.	.21	@ .22
Sulphur chloride	lb.	.08	@ .13½
Sulphur, Bergenport brand, 100% pure (bbls.)	cwt.	2.75	@ 3.05
(bags)	cwt.	2.50	@ 2.80
Sulphur, Bklyn bd. (bbls.)	cwt.	2.75	@ 3.30
superfine com. (bgs.)	cwt.	2.00	@ 2.50
(bbls.)	cwt.	2.40	@ 2.90

(See also Colors—Antimony)

Waxes

Wax, beeswax, white, com	lb.	.45	@
ceresine, white	lb.	.12	@
carnauba	lb.	.20	@
montan	lb.	.05	@ .05½
ozokerite, black	lb.	.18	@
green	lb.	.27	@ .28
paraffine	lb.	.02¾	@ .05
sweet wax	lb.	.10	@ .12

RUBBER AND LATEX VESSELS IN HEVEA LEAVES

Dr. W. Bobilioff[1] has investigated the occurrence of caoutchouc and latex vessels in the leaves of Hevea and comes to the conclusion that there is no connection whatever between the amount of rubber in the leaves and the productivity of trees. Consequently trees cannot be selected by determining the quantity of caoutchouc in the leaves.

In the leaves of Hevea, the latex vessels do not act as food conductors. The slight increase in the amount of rubber present in wintering leaves furnishes a further proof in favor of the decision that the function of the latex vessels is excretory and that the rubber is an excretory product.

INFLUENCE OF SEASONAL VARIATIONS ON LATEX AND RUBBER

A series of experiments have been carried out by O. de Vries and W. Spoon[1] with regard to the influence of seasonal variations on latex and rubber. Rubber crêpe was regularly prepared according to strictly standardized methods over a period of more than a year from the latex of two groups of about 3,500 trees each on an estate and of one group of 147 trees in the experimental garden.

Seasonal variations—dry and wet monsoons, wintering, flowering, and seed-bearing—were found not to cause appreciable deviations in the vulcanizing properties of rubber, in spite of the differences in sugar content and the course of spontaneous coagulation, data on which have already been published. If a suitable method of preparation is chosen, the time of cure may remain very uniform throughout the year, while tensile strength and slope remain practically constant.

[1]Archief voor de Rubbercultuur, May, 1923.

Crutch Pad with Pneumatic Cushion

Of interest to the dealer in druggists' and surgical sundries is the improved pneumatic crutch tip illustrated, which is molded in tough but resilient rubber and is provided with a fibrous non-slipping pad. It is supplied to the trade in boxes of one dozen each size, in assorted colors, and though heavier than the ordinary crutch pad it is lighter weight and lower in price than the heavy crutch shoe. —Reliance Rubber Co., Limited, 212-13 Upper Thames street, London, E. C. 4.

Crutch Pad

A NEW BRAKE LINING KNOWN AS "TELAMITE" IS BEING PLACED on the market by George Angus & Co., Limited, Newcastle-on-Tyne, Northumberland, England.

THE NEW GUTTA-PERCHA CO., LIMITED, DASHWOOD HOUSE, New Broad street, London, E. C. 2, is featuring an insulating material called "Pernax," for application to cables.

Crude Rubber Arrivals at New York as Reported by Importers

Parás and Caucho

	Fine	Medium	Coarse	Caucho	Cametá
JUNE 17. By "Lalande," Pará.					
H. A. Astlett & Co.	10,700	.....	18,850	9,600	.....
JULY 3. By "Francis," Pará, Manáos and Iquitos.					
H. A. Astlett & Co.	14,730	2,150	82,800	33,680	.....
Paul Bertuch	‡37,833	‡196	‡2,470	‡24,152	.....
General Rubber Co.	11,200	.....	.....	.....	.....
L. Littlejohn & Co., Inc.	¶67,200	.....	.....	.....	.....
Poel & Kelly, Inc.	52,695	4,000	27,659	132,517	.....
JULY 7. By "Pencone," Pará.					
General Rubber Co.	.....	.....	.....	.....	85,120	.....
JULY 14. By "Lassell," Pará and Brazil.					
Paul Bertuch	2,123	864	1,369	143	.....
Meyer & Brown, Inc.	.....	.....	12,320	7,840	.....

‡Washed and dried in Brazil. ¶Fine and medium.

Plantations

(Figured at 180 lbs. to the bale or case)

	Pounds
JUNE 10. By "Scythian," London.	
Hood Rubber Co.	*22,555
JUNE 16. By "Vollendam," Rotterdam.	
H. A. Astlett & Co.	55,242
JUNE 20. By "Bali," Far East.	
General Rubber Co.	576,200
F. R. Henderson & Co., Inc.	25,000
Hood Rubber Co.	*22,335
L. Littlejohn & Co., Inc.	313,600
Meyer & Brown, Inc.	160,720
H. Muehlstein & Co., Inc.	40,320
Poel & Kelly, Inc.	300,037
Fred Stern & Co., Inc.	33,177
Charles T. Wilson Co., Inc.	136,640
JUNE 21. By "Menominee," London.	
Baird Rubber & Trading Co., Inc.	390,700
General Rubber Co.	686,560
JUNE 21. By "Rotterdam," Rotterdam.	
H. Muehlstein & Co., Inc.	22,400
JUNE 22. By "Baltic," Liverpool.	
Baird Rubber & Trading Co.	57,600
General Rubber Co.	103,040
Poel & Kelly, Inc.	14,668
JUNE 22. By "Bolton Castle," Far East.	
H. A. Astlett & Co.	33,600
Baird Rubber & Trading Co., Inc.	274,400
General Rubber Co.	1,627,200
Hood Rubber Co.	*420,717
L. Littlejohn & Co., Inc.	1,814,400
Meyer & Brown, Inc.	2,800
H. Muehlstein & Co., Inc.	44,803
Poel & Kelly, Inc.	271,936
Fred Stern & Co., Inc.	172,773
Chas. T. Wilson Co., Inc.	385,280
JUNE 22. By "Slavic Prince," Far East.	
H. A. Astlett & Co.	156,800
Baird Rubber & Trading Co., Inc.	156,800
General Rubber Co.	268,800
F. R. Henderson & Co., Inc.	890,490
Hood Rubber Co.	*311,625
J. T. Johnstone & Co., Inc.	24,640
L. Littlejohn & Co., Inc.	1,232,000
Meyer & Brown, Inc.	440,160
H. Muehlstein & Co., Inc.	380,800
Poel & Kelly, Inc.	351,296
Chas. T. Wilson Co., Inc.	154,560
JUNE 23. By "Barbodian," London.	
Hood Rubber Co.	*56,106
Poel & Kelly, Inc.	*22,540
JUNE 23. By "Elveric," Colombo.	
H. Muehlstein & Co., Inc.	123,200
JUNE 23. By "Ixion," Far East.	
H. A. Astlett & Co.	246,400
H. A. Astlett & Co.	*33,600
Baird Rubber & Trading Co., Inc.	705,600
General Rubber Co.	771,680
F. R. Henderson & Co., Inc.	118,568
Hood Rubber Co.	56,000
J. T. Johnstone & Co., Inc.	172,480
L. Littlejohn & Co., Inc.	1,926,400
Meyer & Brown, Inc.	542,080
H. Muehlstein & Co., Inc.	190,400
Poel & Kelly, Inc.	498,941
Poel & Kelly, Inc.	*56,000
Fred Stern & Co., Inc.	100,800
Chas. T. Wilson Co., Inc.	253,120
JUNE 23. By "Stadsdyk," Far East.	
General Rubber Co.	199,360
F. R. Henderson & Co., Inc.	94,360
L. Littlejohn & Co., Inc.	1,030,400
Meyer & Brown, Inc.	111,440
H. Muehlstein & Co., Inc.	188,160
Poel & Kelly, Inc.	404,300
Chas. T. Wilson Co., Inc.	56,000
JUNE 24. By "Kumeric," Far East.	
H. A. Astlett & Co.	22,400
General Rubber Co.	44,800
Hood Rubber Co.	*22,440
L. Littlejohn & Co., Inc.	67,200
Poel & Kelly, Inc.	56,000
Fred. Stern & Co., Inc.	22,400
JUNE 24. By "Esther Dollar," Far East.	
H. A. Astlett & Co.	89,600
Baird Rubber & Trading Co., Inc.	257,600
General Rubber Co.	191,520
F. R. Henderson & Co., Inc.	193,400
Hood Rubber Co.	2,276
Hood Rubber Co.	*246,775
L. Littlejohn & Co., Inc.	1,254,400
Meyer & Brown, Inc.	112,000
Poel & Kelly, Inc.	447,301
Fred. Stern & Co., Inc.	130,395
Chas. T. Wilson Co., Inc.	56,000
JUNE 24. By "Caronia," London.	
General Rubber Co.	497,280
Poel & Kelly, Inc.	13,169
JUNE 26. By "Kandahar," Far East.	
Hood Rubber Co.	*89,130
J. T. Johnstone & Co.	61,600
L. Littlejohn & Co., Inc.	11,209
H. Muehlstein & Co., Inc	44,800
H. Muehlstein & Co., Inc.	*56,000
JUNE 27. By "Saxonia," London.	
Poel & Kelly, Inc.	696,985
JUNE 29. By "Muncaster Castle," Singapore.	
F. R. Henderson & Co., Inc.	298,550
JUNE 30. By "Maine," Far East.	
General Rubber Co.	660,800
Chas. T. Wilson Co., Inc.	560,000
JULY 1. By "President Adams," London.	
General Rubber Co.	430,080
JULY 2. By "Franconia," London.	
General Rubber Co.	179,200
JULY 3. By "Albania," London.	
Poel & Kelly, Inc.	30,916
JULY 3. By "President Monroe," London.	
General Rubber Co.	336,000
JULY 3. By "Tukuyo Maru," Far East.	
L. Littlejohn & Co., Inc.	112,000
JULY 5. By "Karonga," Far East.	
H. A. Astlett & Co.	134,400
H. A. Astlett & Co.	*56,000
Baird Rubber & Trading Co., Inc.	117,600
General Rubber Co.	721,280
Hood Rubber Co.	*44,800
J. T. Johnstone & Co., Inc.	394,056
L. Littlejohn & Co., Inc.	1,019,200
Meyer & Brown, Inc.	504,000
H. Muehlstein & Co., Inc.	22,400
Poel & Kelly, Inc.	265,448
Chas. T. Wilson Co., Inc.	123,200
JULY 5. By "Meltonian," London.	
Poel & Kelly, Inc.	*11,258
JULY 6. By "Veendam," Far East.	
L. Littlejohn & Co., Inc.	22,400
JULY 9. By "Carmania," London.	
General Rubber Co.	112,000
Poel & Kelly, Inc.	8,960
JULY 9. By "Havre Maru," Far East.	
Baird Rubber & Trading Co., Inc.	56,000
General Rubber Co.	26,880
L. Littlejohn & Co., Inc.	179,200
Meyer & Brown, Inc.	107,520
Poel & Kelly, Inc.	357,899
Chas. T. Wilson Co., Inc.	11,200
JULY 9. By "West Mahomet," Far East.	
Baird Rubber & Trading Co., Inc.	56,000
General Rubber Co.	663,400
L. Littlejohn & Co., Inc.	190,400
Meyer & Brown, Inc.	78,400
Poel & Kelly, Inc.	134,573
Fred. Stern & Co., Inc.	51,739
Chas. T. Wilson Co., Inc.	33,600
JULY 10. By "President Van Buren," London.	
General Rubber Co.	716,800
JULY 12. By "Atreus," Far East.	
H. A. Astlett & Co.	56,000
Baird Rubber & Trading Co., Inc.	179,200
General Rubber Co.	1,189,280
F. R. Henderson & Co., Inc.	159,520
Hood Rubber Co.	*22,400
J. T. Johnstone & Co., Inc.	305,760
L. Littlejohn & Co., Inc.	1,064,000
Meyer & Brown, Inc.	110,880
Poel & Kelly, Inc.	449,504
Fred. Stern & Co., Inc.	56,000
JULY 14. By "City of Hankow," Far East.	
Baird Rubber & Trading Co., Inc.	168,000
General Rubber Co.	560,000
Hood Rubber Co.	*22,440
L. Littlejohn & Co., Inc.	112,000
Poel & Kelly, Inc.	123,200
Chas. T. Wilson Co., Inc.	201,600
JULY 15. By "Vennonia," London.	
Poel & Kelly, Inc.	49,250
JULY 16. By "Crisfield," Colombo.	
General Rubber Co.	29,120

*Arrived at Boston.

Rubber Latex

	Pounds
JUNE 23. By "Barbodian," London.	
Hood Rubber Co. gals.	1,161

Balata

JUNE 27. By "Carillo," Cartegena.	
H. A. Astlett & Co.	2,000
JUNE 29. By "Paria," Paramaribo and Cayenne.	
Middleton & Co., Ltd.	20,409
JULY 3. By "Francis," Iquitos and Brazil.	
H. A. Astlett & Co.	76,600
Paul Bertuch	10,844

Africans

JUNE 19. By "Tyrrhenia," Hamburg.	
Fred Stern & Co., Inc.	14,421
JUNE 23. By "Collamer," Bordeaux.	
Poel & Kelly, Inc.	33,249
JULY 6. By "Belgenland," Antwerp.	
Fred Stern & Co., Inc.	24,231

Gutta Percha

JUNE 21. By "Slavic Prince," Singapore.	
L. Littlejohn & Co., Inc.	68,000
JULY 3. By "Tukuyo Maru," Java.	
L. Littlejohn & Co., Inc.	56,000

Gutta Siak

JUNE 21. By "Slavic Prince," Singapore.	
L. Littlejohn & Co., Inc.	56,000
JUNE 22. By "Bolton Castle."	
F. R. Henderson & Co., Inc.	24,000
L. Littlejohn & Co., Inc.	112,000
JUNE 23. By "Ixion," Singapore.	
F. R. Henderson & Co., Inc.	57,200
JULY 8. By "Karonga," Singapore.	
F. R. Henderson & Co., Inc.	57,000
JULY 12. By "Atreus," Singapore.	
L. Littlejohn & Co., Inc.	78,400

Pontianak

JUNE 21. By "Bali," Borneo.	
L. Littlejohn & Co., Inc.	95,000
JUNE 21. By "Slavic Prince," Singapore.	
L. Littlejohn & Co., Inc.	157,000
JUNE 22. By "Bolton Castle," Singapore.	
L. Littlejohn & Co., Inc.	179,200
JUNE 22. By "Stadsdyk," Java.	
L. Littlejohn & Co., Inc.	132,000
JUNE 23. By "Ixion," Singapore.	
F. R. Henderson & Co., Inc.	181,440
JUNE 24. By "Esther Dollar," Singapore.	
F. R. Henderson & Co., Inc.	118,370
JULY 3. By "Tukuyo Maru."	
L. Littlejohn & Co., Inc.	302,400
JULY 8. By "Karonga," Singapore.	
F. R. Henderson & Co., Inc.	228,060

Guayule

JUNE 23-JULY 18. By "Railways," Mexico.	
Continental Rubber Co.	368,000

Exports of India Rubber Manufactures from the

EXPORTED TO	Belting Value	Hose Value	Packing Value	Thread Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Canvas Shoes with Rubber Soles Pairs	Canvas Shoes with Rubber Soles Value	Soles and Heels Value	Leather Cloth or Artificial Leather Value	Waterproofed Auto Cloth Value
EUROPE													
Austria	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Azores and Madeira Islands	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belgium	$2,343	$4,878	$54	$3,346	.....	.....	.....	.....	.....	.....	.....	.....	.....
Czechoslovakia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	$2,596	$1,630
Denmark	3,007	445	1,281	.....	172	$527	744	$309	218	$497	$243	2,645	2,578
Esthonia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Finland	2,520	260	.....	.....	.....	.....	.....	.....	120	171	190	.....	.....
France	113	1,675	2,118	16,388	.....	.....	.....	.....	.....	.....	.....	67,419	512
Germany	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	87	.....
Greece	.....	891	.....	.....	.....	.....	.....	.....	.....	.....	.....	194	126
Iceland and Faroe Islands	.....	.....	.....	.....	1,398	3,150	.....	.....	.....	.....	.....	86	63
Italy	.....	.....	117	3,544	50	151	6	25	.....	.....	65	7,246	.....
Latvia	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Malta, Gozo, and Cyprus Islands	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Netherlands	21	2,244	.....	.....	.....	.....	.....	.....	432	445	720	.....	433
Norway	15,173	362	.....	.....	1,139	3,014	3,282	7,382	1,848	1,440	2,513	677	703
Portugal	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rumania	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spain	158	210	164	2,087	384	1,003	.....	.....	.....	.....	.....	.....	.....
Sweden	1,381	865	382	.....	236	898	.....	.....	.....	.....	2	6,452	.....
Switzerland	483	.....	.....	.....	.....	.....	456	249	.....	.....	363	7,616	.....
Turkey in Europe	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,072	272
England	5,960	13,526	4,113	65,889	2,507	7,866	12,744	6,556	8,096	8,757	1,792	16,124	5,848
Scotland	1,161	1,219	.....	.....	372	756	.....	.....	.....	.....	.....	6,309	.....
Ireland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yugoslavia, Albania, etc	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
TOTALS, EUROPE	$32,320	$26,575	$8,229	$91,254	6,258	$17,365	17,232	$14,521	10,714	$11,310	$5,998	$119,523	$12,165
NORTH AMERICA													
Canada—Maritime Provinces	$465	$89	.....	.....	834	$2,965	.....	.....	.....	.....	$178	$140	$87
Quebec and Ontario	4,109	13,775	$6,280	$6,834	584	1,704	1,165	$3,027	2,221	$3,447	2,207	42,980	28,393
Prairie Provinces	35	143	19	.....	.....	.....	.....	.....	72	96	.....	1,883	.....
Brit. Columbia and Yukon	1,703	1,616	656	.....	1,520	5,566	$9	181	1,800	1,117	.....	176	655
British Honduras	310	94	.....	.....	.....	.....	.....	.....	160	218	.....	.....	.....
Costa Rica	209	710	789	.....	.....	.....	.....	.....	.....	.....	1,057	480	369
Guatemala	282	300	23	.....	.....	.....	.....	.....	2,136	1,416	344	.....	.....
Honduras	32	726	296	.....	.....	.....	296	320	703	862	316	.....	.....
Nicaragua	.....	178	44	.....	.....	.....	.....	.....	418	322	759	70	.....
Panama	.....	5,662	243	.....	.....	.....	429	618	2,486	3,523	1,527	235	296
Salvador	.....	1,190	.....	.....	.....	.....	.....	.....	140	105	833	262	125
Mexico	28,051	22,581	8,747	500	28	96	797	739	46,978	43,280	14,033	2,306	2,488
Miquelon and St. Pierre Islands	.....	.....	.....	.....	96	312	.....	.....	.....	.....	.....	.....	.....
Newfoundland and Labrador	.....	583	.....	.....	1,632	4,554	1,591	2,820	222	178	224	235	.....
Bermuda	.....	451	.....	.....	.....	.....	1	1	486	485	135	.....	89
Barbados	.....	50	.....	.....	.....	.....	.....	.....	384	360	16	.....	.....
Jamaica	.....	319	37	.....	.....	.....	.....	.....	4,613	3,455	28	176	701
Trinidad and Tobago	.....	218	839	.....	.....	.....	303	309	1,690	1,296	45	.....	273
Other British West Indies	50	82	19	.....	.....	.....	168	108	3,024	2,431	48	.....	.....
Cuba	2,224	14,462	4,272	.....	48	142	228	158	94,507	59,493	7,316	15,814	8,040
Dominican Republic	635	1,215	248	.....	.....	.....	.....	.....	588	596	35	.....	73
Dutch West Indies	.....	.....	19	.....	.....	.....	.....	.....	2,228	1,716	91	.....	37
French West Indies	.....	.....	.....	.....	.....	.....	.....	.....	339	266	.....	.....	.....
Haiti	155	198	17	.....	.....	.....	.....	.....	228	212	357	71	189
Virgin Islands of United States	.....	11	.....	.....	.....	.....	.....	.....	487	286	.....	.....	.....
TOTALS, NORTH AMERICA	$38,260	$64,653	$22,548	$7,334	4,742	$15,339	5,037	$8,281	165,910	$125,160	$29,549	$64,828	$41,815
SOUTH AMERICA													
Argentina	$13,072	$2,287	$849	$101	648	$1,667	648	$648	114,200	$86,085	$2,770	$6,094	$19,724
Bolivia	1,841	135	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	120
Brazil	8,363	5,128	2,404	506	12	42	350	254	.....	.....	.....	2,173	2,798
Chile	33,136	4,503	251	.....	106	286	100	171	575	414	157	1,138	725
Colombia	483	240	110	.....	.....	.....	.....	.....	439	781	3,074	725	858
Ecuador	.....	520	179	.....	12	43	6	4	670	688	249	.....	.....
British Guiana	.....	.....	21	.....	.....	.....	.....	.....	264	263	.....	.....	.....
Dutch Guiana	16	10	.....	.....	.....	.....	.....	.....	175	182	243	.....	.....
French Guiana	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Peru	3,979	1,112	1,075	.....	246	1,628	.....	.....	.....	.....	.....	.....	.....
Uruguay	.....	455	353	.....	186	491	1,100	559	8,500	6,102	300	406	949
Venezuela	133	340	2,130	.....	.....	.....	.....	.....	.....	.....	666	1,313	1,034
TOTALS, SOUTH AMERICA	$61,023	$14,730	$7,372	$607	1,210	$4,157	2,204	$1,636	124,823	$94,515	2,228	878	.....
ASIA											$9,687	$12,727	$26,208
British India	$3,624	$2,413	.....	.....	360	$470	96	$79	6,900	$8,584	.....	.....	.....
Ceylon	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Straits Settlements	143	34	$224	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
China	5,471	290	785	$5,288	36	106	50	131	578	591	$115	.....	$330
Chosen	.....	169	.....	.....	.....	.....	.....	.....	66	63	200	$4,291	7,246
Java and Madura	.....	74	223	.....	.....	.....	.....	.....	528	424	.....	.....	.....
Other Dutch East Indies	592	6,499	.....	.....	.....	.....	.....	.....	432	574	1,462	.....	.....
Far Eastern Republic	.....	.....	.....	.....	.....	.....	.....	.....	280	236	.....	.....	.....
French Indo China	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hejaz, Arabia, etc	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hongkong	.....	2,651	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Japan	875	3,669	3,012	16,899	3,507	5,091	7,679	6,097	48	74	.....	.....	239
Kwangtung, leased territory	.....	197	.....	.....	.....	.....	.....	.....	12	19	.....	5,913	518
Palestine and Syria	.....	.....	258	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Persia	.....	.....	.....	.....	.....	.....	.....	.....	522	374	.....	.....	.....
Philippine Islands	3,948	3,296	2,564	.....	.....	.....	1,032	787	50,462	38,537	1,435	1,329	1,182
TOTALS, ASIA	$14,653	$19,292	$7,066	$22,187	3,903	$5,667	8,857	$7,094	59,828	$49,476	$3,212	$11,533	$9,515
OCEANIA													
Australia	.....	$52	$1,363	.....	.....	.....	4,356	$1,933	.....	.....	$156	$35,680	$4,349
British Oceania	.....	.....	.....	.....	.....	.....	.....	.....	1,212	$1,139	.....	.....	.....
French Oceania	$775	40	.....	.....	.....	.....	.....	.....	1,603	1,658	240	.....	21
New Zealand	4,287	228	556	.....	1,037	$3,465	24	16	288	112	350	2,732	1,078
TOTALS, OCEANIA	$5,062	$320	$1,919	.....	1,037	$3,465	4,380	$1,949	3,103	$3,109	$746	$38,412	$5,448

United States by Countries During May, 1923

Waterproofed Clothing Value	Pneumatic Casings: Automobile Number	Pneumatic Casings: Automobile Value	Pneumatic Casings: Others Value	Solid Tires: Automobile and Motor Truck Value	Solid Tires: Others Value	Pneumatic Tubes: Automobile Number	Pneumatic Tubes: Automobile Value	Pneumatic Tubes: Others Value	Druggists' Rubber Sundries: Tire Repair Materials Value	Druggists' Rubber Sundries: Sundries Value	Hard Rubber Goods: Battery Jars and Accessories Value	Hard Rubber Goods: Other Electrical Supplies Value	Hard Rubber Goods: Others Value	All Other Rubber Manufactures Value	Totals Value
.....	140	$2,530	$309	.....	.....	140	$302	$51	.....	.....	.....	.....	.....	.....	$3,192
.....	64	762	12	.....	.....	78	234	8	.....	.....	.....	.....	.....	.....	1,016
.....	1,471	15,425	167	.....	$19	541	1,413	208	$1,027	$719	.....	.....	.....	$4,415	38,240
.....	4	313	.....	.....	.....	6	52	.....	.....	.....	.....	.....	.....	.....	365
.....	5,111	65,773	1,500	$1,405	.....	3,959	6,227	131	1,513	2,495	.....	.....	$71	4,500	95,147
.....	100	1,928	.....	.....	.....	115	264	.....	.....	.....	.....	.....	.....	.....	2,192
.....	460	5,383	.....	.....	.....	349	675	.....	194	.....	.....	.....	.....	1,047	10,440
.....	2,625	15,365	.....	120	.....	2,587	2,346	.....	3,496	708	.....	.....	2,978	12,711	125,949
.....	200	2,770	.....	.....	.....	220	466	.....	18	.....	.....	.....	.....	1,250	4,591
.....	133	2,560	.....	866	.....	222	452	.....	.....	.....	.....	.....	.....	.....	5,089
.....	183	2,273	.....	165	.....	344	608	.....	.....	.....	.....	.....	.....	100	6,445
.....	3,027	36,665	2,954	.....	.....	3,908	6,524	604	70	1,650	.....	.....	.....	177	59,792
.....	.....	.....	.....	.....	.....	.....	.....	.....	33	.....	.....	.....	.....	.....	33
.....	86	965	.....	.....	.....	38	79	.....	.....	.....	.....	.....	.....	.....	1,044
.....	454	8,506	3,112	.....	.....	395	616	489	317	263	.....	.....	.....	1,941	19,107
$119	3,471	57,802	1,856	1,091	.....	2,747	4,440	131	2,440	.....	.....	.....	.....	1,629	100,772
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	845	845
.....	122	1,703	.....	.....	.....	133	234	.....	38	.....	.....	.....	.....	14	1,989
.....	359	5,431	38	1,893	.....	374	606	.....	703	12	.....	.....	.....	2,517	21,276
.....	5,065	68,694	270	3,006	.....	3,881	6,452	127	1,223	606	.....	.....	.....	657	92,540
.....	129	2,606	.....	.....	.....	133	340	.....	.....	.....	.....	.....	.....	1,223	7,245
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	110
40	39,953	333,723	4,038	52,244	.....	16,745	27,548	398	467	18,234	$62	.....	34,948	49,077	657,210
2,184	154	866	.....	114	.....	10	47	.....	.....	.....	.....	.....	.....	1,472	14,128
.....	1,045	10,136	.....	.....	.....	1,122	2,163	.....	.....	.....	.....	.....	.....	.....	12,299
.....	304	4,635	.....	.....	.....	386	931	.....	.....	.....	.....	.....	.....	.....	5,566
$2,343	64,660	$646,814	$14,256	$60,904	$19	38,433	$63,019	$2,147	$11,539	$24,687	$62	.....	$37,997	$83,575	$1,286,622
$344	119	$1,697	$45	.....	$22	22	$106	.....	$43	$82	$574	.....	$188	$4,018	$11,043
2,635	3,846	4,551	344	$3,194	262	1,807	2,580	$462	3,590	9,238	4,734	$3,779	11,905	92,245	293,239
353	1,033	8,287	45	528	21	91	147	126	122	660	397	.....	327	6,662	19,851
384	80	1,646	34	2,060	26	150	297	.....	5	330	11	.....	394	3,571	20,422
.....	53	506	.....	.....	.....	34	59	.....	8	7	.....	.....	.....	.....	1,196
132	89	2,253	50	92	30	66	203	.....	.....	7	.....	.....	.....	300	6,681
.....	138	3,089	50	94	110	186	396	13	10	60	500	.....	.....	201	6,888
27	92	1,203	98	727	.....	172	336	38	.....	241	.....	.....	20	134	5,376
.....	36	690	16	205	106	27	62	.....	.....	17	.....	.....	.....	14	2,483
1,409	788	8,637	324	619	6	628	1,061	220	173	647	290	.....	74	1,671	27,235
.....	60	1,502	.....	745	.....	213	487	.....	.....	.....	2	.....	.....	93	5,344
16,485	5,912	56,180	2,685	1,929	412	9,728	11,216	493	1,799	5,094	184	437	372	17,584	237,691
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	312
1,801	165	2,575	.....	149	313	184	348	.....	9	32	.....	.....	.....	230	14,051
29	.....	.....	.....	.....	515	.....	.....	.....	.....	86	.....	.....	.....	200	1,991
.....	65	774	63	.....	.....	41	70	24	.....	22	.....	.....	.....	17	1,396
.....	711	8,657	.....	1,472	138	1,141	1,997	.....	126	63	.....	22	.....	1,076	18,267
198	649	6,556	.....	270	.....	614	795	.....	50	287	.....	70	.....	472	11,678
44	105	872	655	.....	41	117	173	.....	.....	.....	.....	.....	.....	70	4,593
20,206	6,437	74,458	999	31,176	300	8,581	13,206	335	1,070	6,036	100	221	300	13,094	273,422
.....	611	6,842	40	777	.....	714	1,326	.....	132	463	.....	78	.....	617	13,077
.....	76	771	14	.....	.....	79	272	.....	54	.....	.....	.....	.....	262	3,236
.....	179	1,476	.....	367	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	2,118
12	228	2,120	9	.....	209	236	581	12	60	.....	.....	.....	50	128	4,380
.....	32	158	.....	.....	.....	50	121	.....	1	.....	.....	.....	.....	114	691
$44,059	21,504	$236,452	$5,471	$44,404	$2,511	24,891	$35,839	$1,723	$7,252	$23,372	$6,792	$4,607	$13,630	$142,782	$986,661
.....	7,069	$80,130	$450	$3,984	$1,121	9,895	$14,749	$186	$4,002	$3,579	.....	.....	.....	$4,731	$246,229
.....	300	4,824	.....	980	.....	263	542	.....	54	.....	.....	.....	.....	333	8,829
$460	2,600	26,472	320	800	.....	88	84	320	863	740	$25	.....	$250	1,699	53,701
.....	717	10,600	.....	755	903	324	451	.....	590	858	.....	$879	.....	1,829	57,646
478	446	7,092	210	602	.....	506	1,043	13	87	258	.....	.....	94	2,002	18,150
76	153	3,253	.....	191	.....	183	393	.....	.....	29	.....	.....	.....	363	5,988
185	83	1,047	38	286	.....	148	270	.....	.....	.....	.....	.....	.....	662	2,772
40	42	312	.....	94	.....	52	68	.....	16	.....	.....	.....	.....	307	1,288
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1,642	995	15,268	.....	816	.....	1,077	1,978	.....	76	112	.....	.....	.....	1,749	31,090
4,080	964	10,779	.....	52	.....	365	1,424	.....	802	328	.....	.....	.....	3,501	31,939
222	1,493	14,438	538	442	379	1,986	3,151	196	247	564	.....	.....	.....	93	25,979
$7,183	14,802	$174,215	$1,556	$9,002	$2,403	14,887	$24,153	$715	$6,737	$6,468	$25	$879	$344	$17,269	$483,611
$15	412	$4,694	$360	$3,373	$1,464	281	$532	.....	$104	.....	$66	.....	.....	$788	$26,566
.....	244	2,770	.....	.....	879	126	378	.....	.....	.....	.....	.....	.....	2	4,029
.....	1,097	11,202	261	3,656	.....	445	670	$78	.....	.....	.....	.....	.....	47	17,351
280	1,080	12,002	55	432	.....	652	884	20	.....	$1,923	2,150	.....	$12	8,684	50,313
.....	790	6,770	.....	.....	.....	199	387	.....	1,630	.....	.....	.....	.....	.....	9,380
.....	829	11,167	160	6,811	993	393	904	24	67	377	1,450	.....	.....	1,108	25,394
.....	28	469	.....	299	.....	16	38	.....	10	.....	.....	.....	.....	.....	8,143
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	345	345
.....	10	254	35	.....	.....	50	150	800	70	59	.....	.....	.....	203	4,535
.....	3,936	40,258	5,061	6,110	.....	980	1,957	1,019	212	604	.....	.....	1,920	11,780	111,014
.....	80	700	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	130	1,027
.....	277	4,528	.....	.....	.....	131	231	.....	102	.....	.....	.....	.....	219	5,712
.....	2	23	.....	.....	.....	2	3	.....	.....	.....	.....	.....	.....	.....	26
2,354	2,449	47,871	1,980	12,872	2,527	1,901	5,215	566	1,885	938	.....	.....	82	7,950	137,318
$2,649	11,234	$142,708	$7,912	$33,553	$5,863	5,176	$11,349	$2,507	$4,080	$3,961	$3,666	.....	$2,014	$31,256	$401,153
$179	4,428	$68,047	$3,483	$7,892	$687	3,175	$6,499	$258	$1,350	$1,559	.....	$338	.....	$5,391	$139,216
249	16	176	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	88	1,652
.....	30	345	204	160	11	2	6	38	12	170	.....	.....	.....	.....	3,880
53	10,006	131,231	1,089	20,134	.....	6,774	20,841	.....	675	37	.....	.....	.....	3,127	190,011
$481	14,480	$199,799	$4,776	$28,186	$698	9,951	$27,346	$296	$2,037	$1,766	.....	$338	.....	$8,606	$334,759

Exports of India Rubber Manufactures from the United

	Belting Value	Hose Value	Packing Value	Thread Value	Boots Pairs	Boots Value	Shoes Pairs	Shoes Value	Canvas Shoes with Rubber Soles Pairs	Canvas Shoes with Rubber Soles Value	Soles and Heels Value	Leather Cloth or Artificial Leather Value	Waterproofed Auto Cloth Value
AFRICA													
Belgian Kongo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
British West Africa	$74	.....	.....	.....	.....	.....	.....	.....	125	$107	.....	.....	.....
British South Africa	35,015	$31,285	$1,809	.....	227	$846	328	$223	3,936	3,061	$3,815	$4,141	$2,960
British East Africa	18,040	13	.....	.....	.....	.....	.....	.....	.....	.....	149	572	.....
Canary Islands	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	774	.....
Egypt	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,646	.....
Algeria and Tunis	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other French Africa	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Morocco	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Portuguese East Africa	7,697	14	149	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Other Portuguese Africa	524	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
TOTALS, AFRICA	$61,350	$31,312	$1,958	.....	227	$840	328	$223	4,061	$3,168	$3,964	$7,133	$2,960
GRAND TOTALS	$212,668	$156,882	$49,092	$121,382	17,377	$46,833	38,038	$33,704	368,439	$286,738	$53,156	$254,156	$98,111

Compiled from statistics supplied by the Bureau of Foreign Commerce, Department of Commerce, Washington, D. C.

United States Crude and Waste Rubber Imports for 1923 (By Months)

	Plantations	Parás	Africans	Centrals	Guayule	Manicoba and Matto Grosso	Total 1923	Total 1922	Balata	Miscellaneous	Waste
January ..... *tons*	29,354	1,233	549	61	.....	.....	31,197	21,867	64	257	382
February	21,815	2,004	308	93	.....	.....	24,220	28,973	25	397	684
March	31,673	1,482	742	19	.....	.....	33,916	28,702	124	738	863
April	29,922	1,095	399	30	142	.....	31,588	14,444	40	1,504	507
May	34,609	1,042	333	24	167	9½	36,184½	20,622	55	463	361
June	31,574	1,032	286	42	.....	.....	32,934	15,750	28	771	300
Totals, 6 months, 1923 ..*tons*	178,947	7,888	2,617	269	309	9½	190,039½	.....	336	4,130	3,097
Totals, 6 months, 1922	124,001	5,109	810	38	281	119	.....	130,358	122	2,556	292

Compiled from statistics supplied by the Rubber Association of America, Inc.

United Kingdom Rubber Statistics

Imports

	May, 1922 Pounds	May, 1922 Value	May, 1923 Pounds	May, 1923 Value
UNMANUFACTURED				
Crude rubber				
From—				
Straits Settlements	30,486	£125,726	38,492	£242,777
Federated Malay States	57,055	259,265	28,611	175,723
British India	7,388	33,274	3,518	22,849
Ceylon and Dependencies	9,507	41,359	8,114	51,368
Other Dutch Possessions in Indian Seas	3,323	16,118	875	5,342
Dutch East Indies (except Other Dutch Possessions in Indian Seas)	13,734	59,978	9,516	62,365
Other countries in East Indies and Pacific, not elsewhere specified	5,131	20,652	1,066	7,560
Brazil	9,965	35,338	4,331	25,814
Peru	.....	.....	277	1,470
South and Central America (except Brazil and Peru)	47	195	268	1,556
West Africa				
French West Africa	.....	.....	989	4,895
Gold Coast	2	8	70	307
Other parts of West Africa	129	477	673	2,568
East Africa, including Madagascar	.....	.....	448	3,272
Other countries	306	1,340	418	2,395
Totals	137,673	£593,730	97,666	£610,261
Waste and reclaimed rubber	1,139	2,096	2,324	3,520
Gutta percha and balata	2,573	30,252	9,359	112,474
Rubber substitutes	20	95	336	620
Totals, unmanufactured	140,805	£626,173	109,685	£726,875
MANUFACTURED				
Boots and shoes ..... *doz. pairs*	15,562	£29,130	18,280	£30,561
Tires and tubes				
Pneumatic				
Outer covers	.....	417,545	.....	335,541
Inner tubes	.....	36,439	.....	49,446
Solid tires	.....	6,799	.....	15,311
Other rubber manufactures	.....	93,631	.....	100,191
Totals, manufactured	.....	£583,544	.....	531,050

Exports

	May, 1922 Pounds	May, 1922 Value	May, 1923 Pounds	May, 1923 Value
UNMANUFACTURED				
Waste and reclaimed rubber	2,346	£4,757	11,916	£11,015
Rubber substitutes	1,354	2,651	1,204	2,675
Totals, unmanufactured	3,700	£7,408	13,120	£13,690
MANUFACTURED				
Boots and shoes ..... *doz. pairs*	10,929	£19,073	20,792	£29,236
Tires and tubes				
Pneumatic				
Outer covers	.....	127,149	.....	166,013
Inner tubes	.....	20,026	.....	28,017
Solid tires	.....	33,755	.....	27,464
Other rubber manufactures	.....	216,579	.....	265,615
Totals, manufactured	.....	£416,582	.....	£516,345

Exports—Colonial and Foreign

	May, 1922 Pounds	May, 1922 Value	May, 1923 Pounds	May, 1923 Value
UNMANUFACTURED				
Crude rubber				
To Russia	297	£1,368	8,797	£53,630
Sweden, Norway and Denmark	1,058	3,830	1,884	12,190
Germany	18,694	71,864	5,175	35,850
Belgium	2,125	7,690	3,845	26,533
France	22,911	87,088	31,894	203,969
Spain	1,604	5,921	304	2,064
Italy	5,908	22,016	6,573	43,720
Other European countries	3,384	16,628	1,138	7,842
United States	15,370	54,388	146,367	1,005,025
Canada	1,346	4,562	2,689	18,640
Other countries	537	2,730	1,171	7,431
Totals	73,234	£278,085	209,837	£1,416,894
Waste and reclaimed rubber	112	408	70	210
Gutta percha and balata	1,209	17,379	938	13,642
Rubber substitutes	.....	.....	.....	.....
Totals, unmanufactured	74,555	£295,872	210,845	£1,430,746
MANUFACTURED				
Boots and shoes ..... *doz. pairs*	237	£1,473	112	£382
Tires and tubes				
Pneumatic				
Outer covers	.....	24,122	.....	15,704
Inner tubes	.....	1,728	.....	3,783
Solid tires	.....	950	.....	1,331
Other rubber manufactures	.....	4,380	.....	7,568
Totals, manufactured	.....	£32,653	.....	£28,768

MEXICO IMPORTED FROM THE UNITED STATES DURING THE FISCAL year ending June 30, 1914, automobile tires valued at $111,948. In 1921 the values had risen to $1,173,826, with a slight decline in the following year to 79,747 tires, valued at $1,014,935.

States by Countries During May, 1923—*Continued*

	Pneumatic Casings			Solid Tires		Pneumatic Tubes					Hard Rubber Goods				
	Automobile			Automobile and Motor Truck		Automobile									
Waterproofed Clothing Value	Number	Value	Others Value	Value	Others Value	Number	Value	Others Value	Tire Repair Materials Value	Druggists' Rubber Sundries Value	Battery Jars and Accessories Value	Other Electrical Supplies Value	Others Value	All Other Rubber Manufactures Value	Totals Value
.....	24	$332	.....	.....	.....	24	$56	.....	.....	.....	.....	.....	.....	.....	$388
.....	103	2,837	.....	.....	.....	120	359	.....	$118	.....	.....	.....	.....	$52	3,547
$4,346	6,558	59,340	$588	$91	.....	7,056	11,550	$96	815	$937	.....	.....	.....	2,732	163,644
.....	236	2,141	30	149	.....	172	300	5	34	.....	.....	.....	.....	29	21,462
.....	188	2,490	12	2,534	.....	216	352	14	118	.....	.....	.....	.....	.....	6,294
.....	822	7,088	.....	.....	.....	306	394	.....	12	.....	.....	.....	.....	1,723	10,863
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	78	78
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	6	120	.....	.....	.....	.....	.....	.....	317	.....	.....	.....	.....	.....	437
680	44	560	.....	.....	.....	44	100	.....	.....	.....	.....	.....	.....	.....	9,200
.....	6	93	.....	.....	.....	30	106	.....	.....	.....	.....	.....	.....	.....	723
$5,026	7,987	$75,001	$630	$2,774	.....	7,968	$13,217	$115	$1,414	$937	.....	.....	.....	$4,614	$216,636
$61,741	134,667	$1,474,989	$34,601	$178,823	$11,494	101,306	$174,923	$7,503	$33,059	$61,131	$10,545	$5,824	$53,985	$288,102	$3,709,442

Rubber Statistics for France

Imports of Crude and Manufactured Rubber

	1921		1922	
	Quintals	Francs	Quintals	Francs
UNMANUFACTURED				
Crude rubber and gutta percha				
From Brazil	32,301		44,505	
England	99,608		146,012	
French Congo	2,345		8,000	
Other French West Africa	6,299	105,905,000	3,601	118,654,000
British Indies	19,310		48,491	
West Africa			1,824	
Indo-China	54,894		30,699	
Other countries			24,827	
Totals	214,757	105,905,000	307,959	118,654,000
MANUFACTURED				
Unvulcanized sheets	816	1,152,000	1,018	1,679,000
Rubber thread	2,162	5,218,000	3,547	9,641,000
Elastic fabric	306	1,801,000	443	2,144,000
Rubberized fabrics	299	1,055,000	195	420,000
Articles of rubberized fabrics	4	24,000	13	77,000
Garment protectors	13	79,000	36	183,000
Garters, belts, etc.	37	315,000	75	406,000
Apparel	211	1,219,000	215	1,487,000
Card clothing	246	1,266,000	357	1,066,000
Rubber footwear	1,506	1,678,000	1,573	2,143,000
Tires and tubes	10,942	23,336,000	14,615	18,852,000
Belting, hose, packing	11,228	21,756,000	11,727	20,308,000
Totals, manufactured	27,770	58,899,000	33,814	58,406,000
Totals, imported	242,527	164,804,000	341,773	177,060,000

Exports of Crude and Manufactured Rubber

UNMANUFACTURED				
Crude rubber and gutta percha:				
To England	2,029		1,139	
United States	2,727		1,080	
Germany	5,022		13,964	
Belgium	30,229	19,891,000	2,160	13,317,000
Spain			3,428	
Italy			3,226	
Other countries			1,797	
Totals	40,007	19,891,000	26,794	13,317,000
MANUFACTURED				
Sheets and threads	348	651,000	573	1,072,000
Elastic fabric	641	6,540,000	882	8,996,000
Rubberized fabric	1,923	14,388,000	2,263	16,927,000
Card clothing	1,173	3,509,000	1,466	4,386,000
Apparel	4,262	43,838,000	1,947	20,044,000
Articles of rubberized fabric	226	2,304,000	173	1,765,000
Footwear	45,328	105,955,000	23,365	54,627,000
Tires and tubes to				
England	35,715		35,905	
Germany	709		1,315	
Belgium	12,580		20,703	
Switzerland	7,562	393,136,000	12,479	404,719,000
Spain	8,841		9,066	
United States	24,352		3,463	
Other countries	50,396		61,354	
Belting, hose, packing	17,013	30,223,000	13,164	23,392,000
Totals, manufactured	211,069	600,544,000	188,118	535,928,000
Totals, exported	251,076	620,435,000	214,912	549,245,000

Rubber Statistics for the Dominion of Canada

Imports of Crude and Manufactured Rubber

	April, 1922		April, 1923	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Rubber, gutta percha, etc.				
From United Kingdom	484,245	$80,891	1,393,471	$480,974
United States	1,079,737	169,121	1,729,928	508,980
British East Indies				
India	11,900	1,904	.....	.....
Ceylon	560,000	110,783	.....	.....
Straits Settlements	190,152	40,406	1,180,438	389,673
Dutch East Indies	45,745	9,120	.....	.....
France	.....	.....	.....	.....
Other countries	.....	.....	116,052	27,536
Totals	2,371,779	$412,225	4,419,889	$1,407,163
Rubber, recovered	40,619	3,934	291,807	25,607
Rubber, powdered, and rubber or gutta percha scrap	102,671	6,692	767,594	29,149
Balata	400	308	1,095	976
Rubber substitutes	17,949	984	38,542	7,476
Totals unmanufactured	2,533,418	$424,143	5,518,927	$1,470,371
PARTLY MANUFACTURED				
Hard rubber sheets and rods	1,814	$1,618	2,170	$1,558
Hard rubber tubes	.....	1,163	.....	2,005
Rubber thread, not covered	2,816	3,522	4,249	5,152
Totals, partly manufactured	4,630	$6,303	6,419	$8,715
MANUFACTURED				
Belting	.....	$17,334	.....	$12,102
Hose	.....	9,633	.....	7,072
Packing	.....	2,702	.....	2,918
Boots and shoes.....*pairs*	1,342	3,088	3,314	8,372
Clothing including waterproofed	.....	5,788	.....	18,304
Gloves	.....	970	.....	1,885
Hot water bottles	.....	340	.....	3,638
Tires, solid.....*number*	.....	12,491	1,012	24,427
Tires, pneumatic.....*number*	.....	92,087	7,118	83,858
Inner tubes .....*number*	.....	11,537	3,476	5,813
Elastic, round or flat	.....	27,984	.....	34,476
Mats and matting	.....	1,161	.....	1,249
Cement	.....	2,755	.....	4,651
Other rubber manufactures	.....	145,151	.....	147,556
Totals, manufactured	.....	$333,021	.....	$356,321
Totals, rubber imports	.....	$763,467	.....	$1,835,407

Exports of Domestic and Foreign Rubber Goods

	April, 1922		April, 1923	
	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
UNMANUFACTURED				
Crude and waste rubber	$1,137	.....	$5,202	$52
Totals, unmanufactured	$1,137	.....	$5,202	$52
MANUFACTURED				
Belting	$6,058	$.....	$5,244	$.....
Canvas shoes with rubber soles	38,588	.....	92,744	.....
Boots and shoes	2,279	.....	8,380	.....
Clothing, including waterproofed	29	.....	1,981	.....
Hose	1,290	.....	5,473	.....
Tires, casings	137,397	.....	468,999	.....
inner tubes	15,056	.....	48,007	.....
Pneumatic	.....	.....	.....	.....
Solid	9,966	.....	2,585	.....
vehicle	.....	251	.....	1,448
Other rubber manufactures	17,770	1,183	13,155	896
Totals, manufactured	$228,433	$1,434	$646,568	$2,344
Totals, rubber exports	$229,770	$1,434	$651,770	$2,396

Official India Rubber Statistics for the United States

Imports of Crude and Manufactured Rubber

	February, 1922		February, 1923	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*free*				
Crude rubber				
From France	185,800	$5,574	66,896	$19,714
Netherlands	242,130	43,876	717,318	282,202
Portugal	555,962	23,690	10,748	784
United Kingdom	14,184,538	2,736,813	4,265,531	1,233,994
Canada	11,716	1,732	740	236
Central America	3,243	324	.....	.....
Mexico	121,000	24,200	.....	.....
Brazil	2,782,351	354,257	4,196,475	938,955
Peru	.....	.....	212,443	40,908
Other South America	92,772	16,467	173,828	43,477
British East Indies	39,423,170	6,225,744	42,703,713	8,805,025
Dutch East Indies	7,965,091	1,296,893	6,003,996	1,365,235
Other countries	1,189,467	97,537	2,027,602	420,293
Totals	66,757,240	$10,827,106	60,379,290	$13,150,823
Balata	145,925	75,920	219,022	105,969
Jelutong (Pontianak)	171,053	13,927	657,047	48,555
Gutta percha	68,800	12,241	78,575	16,179
Rubber scrap	720,899	16,860	1,923,972	80,068
Totals, unmanufactured	67,863,917	$10,946,054	63,257,906	$13,401,594
MANUFACTURED—*dutiable*				
Rubber belting	.....	.....	23,249	$25,401
Other manufactures of and substitutes for rubber	.....	$159,827	.....	55,336

Exports of Domestic Merchandise

MANUFACTURED				
India rubber				
Reclaimed	193,807	$22,004	486,005	$44,544
Scrap and old	697,679	27,663	666,033	24,410
Footwear				
Boots[1] *pairs*	20,018	56,153	27,627	74,252
Shoes[1] *pairs*	50,353	51,003	50,509	38,934
Canvas shoes with rubber soles[1] *pairs*	147,874	132,584	356,126	277,496
Druggists' rubber sundries[1]	66,774	80,230	85,584	85,291
Hard rubber goods				
Battery jars and accessories[1]	13,967	4,168	26,722	11,164
Other electrical supplies[1]	8,991	6,247	27,324	6,122
Other hard rubber goods[1]	14,881	18,536	22,490	20,590
Tires				
Pneumatic casings				
For automobiles[1]	73,805	1,028,757	131,586	1,532,309
Others[1]	2,256	8,166	10,251	42,983
Pneumatic tubes				
For automobiles[1]	47,041	101,301	81,277	134,172
Others[1]	928	967	3,086	3,082
Solid tires				
For automobiles and motor trucks[1]	2,388	68,233	7,909	190,101
Others[1]	36,333	12,236	63,160	15,942
All other tires[1]	.....	.....	.....	.....
Tire-repair materials[1]	41,096	19,148	50,862	18,916
Belting[1]	135,736	76,401	217,984	115,279
Hose[1]	226,720	86,782	341,251	118,435
Packing[1]	65,886	33,468	91,631	44,202
Soles and heels[1]	59,954	28,780	116,362	44,085
Thread[1]	56,142	68,037	68,085	79,422
Other rubber manufactures[1]	387,278	195,682	358,702	220,419
Totals, manufactured	.....	$2,126,546	.....	$3,142,150

Exports of Foreign Merchandise

UNMANUFACTURED				
India rubber	797,857	$159,800	1,942,433	$588,646
Balata	67,784	38,791	14,494	10,411
Gutta percha, rubber substitutes and scrap	6,720	875	2,175	435
Totals, unmanufactured	872,361	$199,475	1,959,102	$599,492
MANUFACTURED				
Gutta percha and india rubber	.....	3,966	1,020	1,196
Totals, manufactured	.....	$3,966	1,020	$1,196

[1] Details of exports of domestic merchandise by countries during February, 1923, appeared on pages 538-541 of our May issue.

Imports of Crude Rubber Into the United States by Customs Districts

	May, 1922		May, 1923	
	Pounds	Value	Pounds	Value
Massachusetts	369,600	$50,722	1,754,223	$560,590
Buffalo	1,818	92	.....	.....
New York	35,062,565	5,327,225	77,596,982	24,153,131
El Paso	77,000	15,400	.....	.....
Maryland	.....	.....	537,750	158,420
Los Angeles	56,000	8,960	50,268	18,288
San Francisco	26,180	3,665	78,400	30,543
Oregon	44,295	9,291	.....	.....
Colorado	89,600	12,342	89,824	32,250
Totals	35,727,058	$5,427,697	80,107,447	$24,953,222

Custom House Statistics

New York

Imports of Crude and Manufactured Rubber

	February, 1922		February, 1923	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—*free*				
Crude rubber				
From Belgium	170,840	$11,282	113,140	$25,568
France	185,800	5,574	66,896	19,714
Germany	.....	.....	860,013	173,175
Netherlands	242,130	43,876	661,534	214,763
Portugal	555,962	23,690	10,748	784
England	14,184,038	2,736,770	4,171,323	1,199,295
Nicaragua	3,243	324	.....	.....
Cuba	20,750	1,576	.....	.....
Dominican Republic	51,576	11,522	.....	.....
Brazil	2,782,351	354,257	4,196,475	938,955
Chile	2,725	444	22,400	5,529
Colombia	31,360	5,836	42,952	9,042
Ecuador	25,066	3,988	87,993	15,899
British Guiana	4,691	2,718	.....	.....
Peru	.....	.....	212,443	40,908
Uruguay	15,930	3,481	20,483	13,007
British India	266,156	39,542	43,675	8,740
Ceylon	6,179,341	1,116,016	6,104,083	1,497,159
Straits Settlements	32,266,407	946,422	34,110,426	6,701,309
China	22,400	2,876	.....	.....
Java	2,537,913	394,354	2,144,168	504,874
Dutch East Indies	5,427,178	902,539	3,781,322	842,480
Far East Republic	551,450	38,637	.....	.....
Hongkong	145,840	11,068	.....	.....
Japan	.....	.....	1,008,000	216,086
Philippine Islands	27,300	4,093	.....	.....
Siam	.....	.....	11,106	3,293
Totals	65,700,447	$10,660,885	57,669,180	$12,430,580
Balata	145,925	$75,920	219,022	$105,969
Jelutong (Pontianak)	163,804	13,308	657,047	48,555
Gutta percha	68,800	12,241	74,225	13,769
Rubber scrap and reclaimed	618,609	10,772	1,391,189	63,399
Totals, unmanufactured	66,697,585	$10,773,126	60,010,663	$12,662,272
Chicle *dutiable*	565,071	295,939	469,550	238,347
MANUFACTURED—*dutiable*				
Rubber belting for machinery	.....	.....	5,455	$8,024
Other manufactures of and substitutes for rubber	896	103,839	.....	36,396
Totals, manufactured	896	$103,839	5,455	$44,420

Exports of Domestic Merchandise

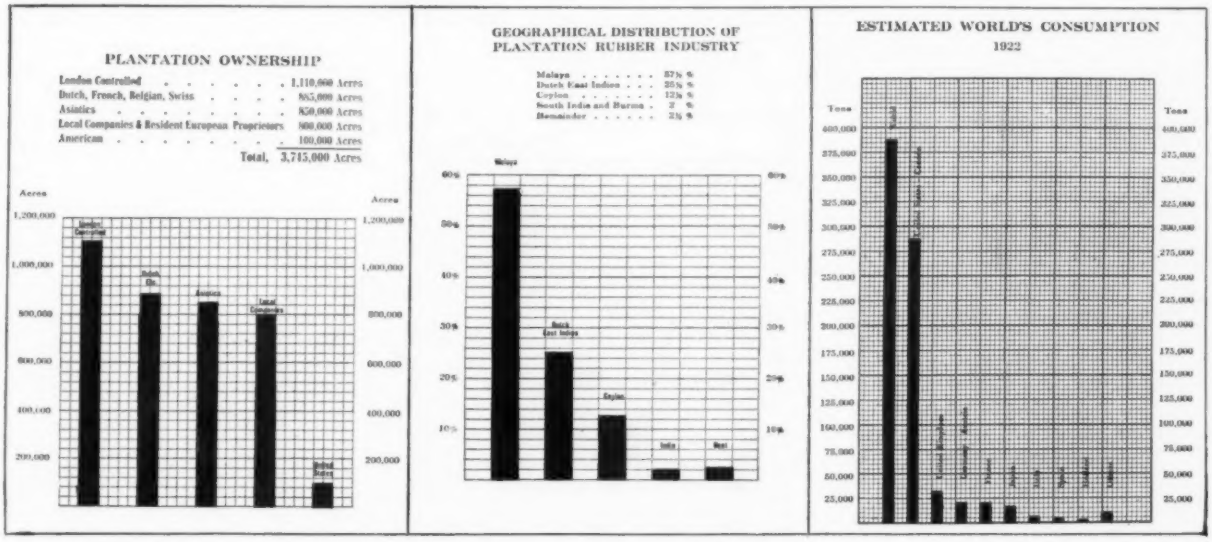
	February, 1922		February, 1923	
	Pounds	Value	Pounds	Value
MANUFACTURED				
India rubber				
Reclaimed	7,757	$819	74,808	$6,704
Scrap and old	451,141	19,101	283,253	17,280
Footwear				
Boots[1] *pairs*	10,495	31,166	12,275	29,516
Shoes[1] *pairs*	15,493	19,909	46,295	33,952
Canvas shoes with rubber soles[1] *pairs*	119,156	106,053	241,715	181,884
Druggists' rubber sundries[1]	49,814	57,668	54,715	55,740
Hard rubber goods				
Battery jars and accessories[1]	2,499	753	10,209	3,516
Other electrical supplies[1]	7,407	3,356	21,869	4,050
Other hard rubber goods[1]	9,031	10,135	18,142	14,964
Tires				
Pneumatic casings				
For automobiles[1]	53,391	764,874	92,207	1,089,231
Others[1]	1,791	6,601	7,694	36,273
Pneumatic tubes				
For automobiles[1]	32,768	65,116	61,211	99,726
Others[1]	924	952	2,646	2,687
Solid tires				
For automobile and motor trucks[1]	1,296	40,677	5,321	125,224
Others[1]	30,406	8,905	41,509	10,791
Tire repair materials[1]	63,948	15,642	22,657	8,982
Belting[1]	29,448	53,260	142,968	68,561
Hose[1]	102,030	37,326	191,836	71,415
Packing[1]	41,603	20,738	45,970	21,456
Soles and heels[1]	46,245	24,218	72,777	33,327
Thread[1]	42,504	51,836	66,241	77,225
Other rubber manufactures[1]	609,349	143,699	162,365	120,345
Totals, manufactured	.....	$1,484,804	.....	$2,109,849

Exports of Foreign Merchandise

	February, 1922		February, 1923	
	Pounds	Value	Pounds	Value
UNMANUFACTURED				
Crude rubber	7,280	$1,470	6,341	$2,236
Balata	67,569	38,751	14,494	10,411
Gutta percha	.....	.....	.....	.....
Totals, unmanufactured	74,849	$40,221	20,835	$12,647
MANUFACTURED				
Rubber manufactures	.....	$1,522	1,000	$1,153
Rubber substitutes	.....	.....	.....	.....
Totals, manufactured	.....	$1,522	1,000	$1,153

Graphical Analysis of the World's Rubber Industry[1]

A VERY clear presentation of some of the main features of the rubber industry, with all its wonderful development, is conveyed by means of the accompanying charts and graphs. From the first of these it will be seen that plantation ownership includes 3,745,000 acres, and that the London controlled estates, representing 1,110,000 acres, are in the lead, followed by the combined Dutch, French, Belgian and Swiss properties, at 885,000 acres. Local companies and resident European proprietors own 800,000 acres, American estates comprising only 100,000 acres.

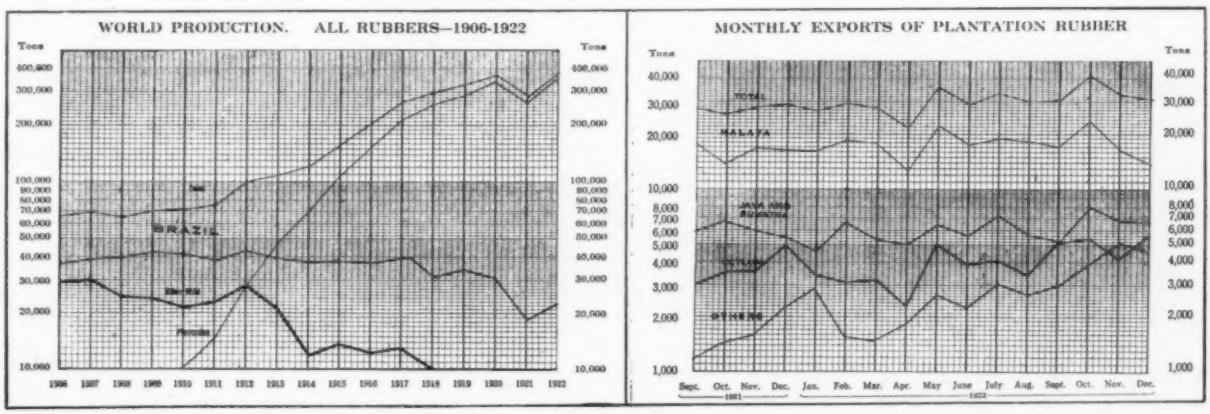


Considered geographically, these estates are shown as being distributed principally through Malaya, which contains 57½ per cent, while the Dutch East Indies and Ceylon total respectively 25½ and 12½ per cent. Other estates in South India, Burma, and elsewhere represent the remaining 4½ per cent.

The world's rubber production rose from approximately 66,000 tons in 1906 to almost 390,000 tons in 1922. This is due mainly to the development of plantation rubber, which, from only 10,000 tons in 1910, increased to approximately 380,000 tons in 1922. Brazilian and other wild rubbers have in contrast declined in recent years from approximately 38,000 and 30,000 tons respectively in 1906 to 22,000 tons in 1922 and 10,000 tons in 1918.

With the world's consumption for 1922 at approximately 390,000 tons, the share of the United States and Canada is estimated at nearly 290,000 tons. Less than 35,000 tons are required to supply the needs of the United Kingdom, while other countries follow in the order named: Germany and Austria, France, Japan, Italy, Spain, Holland, etc.

For the period September, 1921, to January 1, 1923, the total exports of plantation rubber averaged from 22,000 tons to more than 40,000 tons monthly. Of this amount Malaya supplied from 13,000 to 23,000 tons, Java and Sumatra from 4,700 to 8,000 tons, Ceylon from 2,400 to 5,500 tons, while other countries averaged from 1,200 to 4,600 tons. The whole story of the rubber industry, so romantic in certain features, is well summed up in these few statistical tables.



[1] *Courtesy of F. R. Henderson & Co., New York, N. Y.*

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